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This Week in The IRON AGE

Vol. 155, No. 23

June 7, 1945

Editorial

Reconversion Begins in Washington

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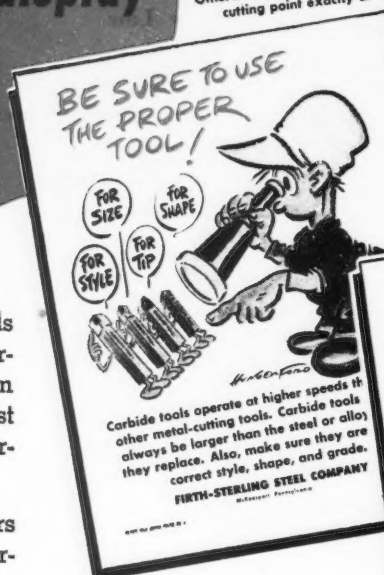
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Reconversion Begins in Washington

GENERAL opinion seems to be that the Japs will be licked in six months to a year. Recent developments bear this out. If the shorter period is the time it will take, then most of the tools with which to do the job have already been made. If unfortunately it should take a year to bring Japan to defeat we shall then have six months more of war production but on a reduced scale. Present day cutbacks are an indication of the logistic thinking.

Six months is not much time to switch back to civilian production. Some manufacturers who did not have to make many changes in plant and equipment may be able to do it in that time or even less. But many more will find it hard to meet the deadline. And if they do not, there will be hell to pay in temporary unemployment.

First step in reconverting America to peacetime production is the reconversion of Washington—the stream-lining of governmental administration. Fortunately it looks as if President Truman realizes this necessity and is preparing to do something about it.

It's a tremendous job! For the past ten years and particularly during the most recent four, bureaus, commissions, boards and agencies with undefined or overlapping authority have been so prolifically generated as to form a labyrinth of regulations through which it is next to impossible for either management or labor to flounder.

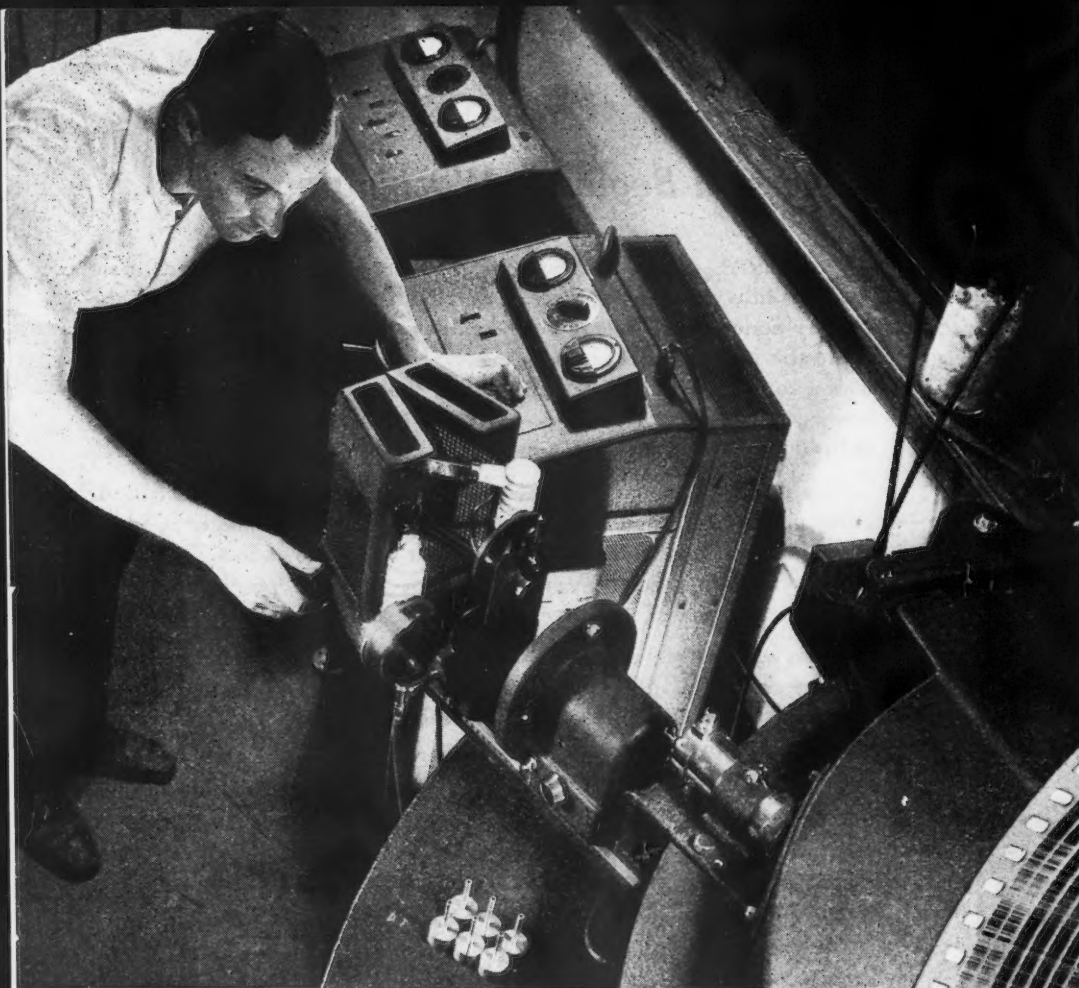
So long as private initiative was subordinated to government directives and to making what one customer, namely Uncle Sam, wanted and ordered, we could and did get by under these difficulties. But how much better we could have done it if order had replaced confusion, no one will ever know.

But now that we are approaching the time when several hundred thousand employers will have the job of satisfying 130 million individual customers and in so doing make work for millions of workers, such confusion, confounded and compounded is unthinkable. You can't set a world's record by running through a sea of molasses.

Unless present manpower regulations are greatly modified or even abolished, the private employer will be helpless to put displaced people to work, regardless of his intent or ability. Unless the priority setup is drastically changed he will still be unable to get the material needed to put them to work even should he have the manpower. And unless the restrictions controlling both prices and wages are considerably eased, he will still be unable to operate even with available material and manpower.

Yes, the starting point of reconversion is Washington, D. C., and not Detroit or Cleveland or Pittsburgh. These and our hundreds of other able and busy communities will take care of themselves if the unnecessary hurdles are removed.

John C. McCune



Examination of the spectrum emanating from the vaporization of the steel sample in an electric arc quickly reveals the chemical content of the sample.

A spectrographic film provides a permanent record of each sample.

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June 5, 1945

NEWS FRONT

Army officials admit difficulties in utilizing jet craft in an offensive war in their present state, and disclose that a new set of tactics are under development for this purpose.

General Electric officials state that the engines have developed as far as possible using existing materials. No mention is being made of multiple compressor systems to increase thrust output.

Army Ordnance announces cancellation of medium tank production at the Pressed Steel Car Co. as of June 30. This cut brings to \$172,000,000 the total of cancellations for this company.

The contract cancelled represents 2775 medium tanks scheduled to December 1945. The cut is stated to affect 450 subcontractors and 3100 workers in the assembly plant.

Policy on cutback announcements in general, excepting the Air Forces, is that they are none of the public's business. This position is thought to be a reflection of governmental agency horror of "labor dislocation", or more baldly, unemployment.

R. J. Thomas, president of UAW-CIO, hopes to interest Henry Kaiser in the purchase and operation of Willow Run for any kind of production. Conferences are under way on both aircraft and automobile production, as well as the Kaiser housing program, in which the CIO is deeply interested.

CIO's awakening demands for static take home pay despite the return to a 40 hour week reached the headlines at Bell Aircraft, Buffalo, where thousands are being laid off immediately due to a P-63 cutback. The same proposal is being pushed at the Van Norman Tool Co., Springfield, Mass.

Due to severe cutbacks on shell steel billets the structural mill at Geneva is shut down May 29. The plate mill is operating two turns a day, six days a week. Two of three blast furnaces and six of nine open hearths are in operation.

Plans for a new bridge to replace the collapsed Tacoma Narrows structure are nearing completion. The new structure, to cost \$10,000,000 will use open trusses 13 feet in depth to replace the original 8 ft. solid steel girders. A 50 per cent wider deck will carry four traffic lanes separated by open grills.

The critical ship repair manpower needs on the West Coast is being plumped with the first detailed news of the scope of the damage wrought by suicide bombers. This information has been censored by the Navy since the beginning of the Ceyte campaign when the problem became serious, until the current recruiting drive got under way.

The 80 per cent complete ore dock at Escanaba, Mich., part of an alternate shipment route to Chicago mills if the Soo locks should have suffered sabotage will be dismantled and scrapped this summer. The project was to have cost \$11,500,000.

The American Bridge Co.'s shipbuilding program at Ambridge, Pa., will be completed in mid-July with the delivery of the last of 143 ships for the Navy. Employment, which hit a peak of 15,000 and now stands at 8300 will drop to 3000.

Advantages like exceptional strength and corrosion resistance have been imparted to aluminum, silicon and phosphor bronze as a result of war spurred research. These special qualities by prolonging usefulness outweigh the high initial cost of the material.

For example: Valve stems used on steam and water lines when made from an alloy of 91 per cent copper, 7 per cent aluminum and 2 per cent silicon have been reported to outlast stems made from other previously tried materials six to one. In rod form in the annealed condition, this alloy averages more than 85,000 lb. per sq. in. tensile strength.

A flexible metallic packing made from Inconel wire mesh has been developed by Johns-Manville to meet the need for a material that can withstand the destructive conditions existing in the exhaust systems of airplane engines equipped with turbosuperchargers.

Specifying Rust Preventives

By J. ALBIN

... A preliminary step is taken to correlate and classify petroleum-base rust prevention products suitable for general industrial purposes. Tables have been compiled to help in the selection of the product appropriate for the protection of the part or machine under specific conditions. At present, government specifications are the only available guideposts since the government has been the chief customer of the end products. Manufacturers of rust preventives, however, are commencing to identify their products with the particular service for which they are intended.

IN the matter of rust prevention, the emphasis has changed from one of development to one of application. A wide range of rustproofing materials were available at the time the war began. What the war has done was to speed the development of specialized products, but mainly the methods of application to assure protection for every type of service. As the picture stands today, it is only necessary to select and apply the correct rustproof material for the protection required.

The selection is not easy. There are several diverse groups of products on the market. The phrase "rust prevention" is called upon to cover each of these groups. Practically, this is all they have in common. Some rust prevention products are used to bring about a state of surface passivation in the metals. Plastics, such as ethyl cellulose, can be made to form a strip-pable coating or "package" about a piecepart, which by acting as a barrier to moisture and air is also reckoned as a rust preventive. Waxes have been developed which exhibit extraordinary power of adhesion for metal surfaces and have high abrasive resistance. Certain of these are very difficult to remove, once a hard coat is formed. Paints, lacquers and primers may also be placed in the class of rust preventive coatings. Metallic soaps have been shown to possess rust-proof powers.

The great bulk of rust preventives can be encompassed in a single classification having as the distinguishing characteristic the fact that the products have been developed from a petroleum base. These preventives are primarily intended to protect surfaces which must later be free of any coating. Their protection though regarded as "temporary" will prevent rust over a period of years in the case of some of the products. In limiting the field of this article to petroleum-base rust preventives which come in many grades and types, it is not to be inferred that this group is all embracing in the field of rust prevention. It is simply that rust prevention has grown into a vastly ramified picture, and it is not possible in an article of this length to achieve a unified discussion except by treating a specific phase or selected group of products. In a forthcoming article, a number of rustproofing products made from plastics, waxes, metallic soaps, among others, will be discussed.

Classifications By Type

The petroleum rust preventives can be grouped according to physical characteristics, or according to service. There is a strong tendency but as yet not generally accepted practice on the part of manufacturers and suppliers to distinguish their products according to the service for which they are intended. However, at the present

time, the only practical guideposts for the selection of rustproof materials are the "specs" established by the Armed Forces. Using the government specifications then as guides, a good classification can be set up that is based on the physical characteristic of the products. An asset of this classification is that it affords a clue to the method of applying the product to surfaces. This classification will be given first, after which will be given a classification according to service.

Table I is a listing of government specification rust preventives separated into three categories based on physical characteristics as explained below. Table II is a partial list of manufacturers with brand name or sample number of products acceptable to the War Department, Army Service Forces, Storage Division, under one or more specifications.

Petroleum-base rust preventives when viewed according to physical characteristics may be separated into (1) preservative oils, (2) solvent cut-backs and (3) solid or semi-solid rust preventives. These will be discussed in this order below:

1. **Preservative Oils**—These oil type rust preventive oils are reckoned to have the following advantages:

a. They are fluid at room temperatures, hence may be applied without heating or any special equipment.

b. They have flash points approximately equal to straight mineral oils of the same viscosity and, therefore, no fire hazard is involved.

c. The protective film does not dry and remains oily; hence, in many instances, it is not necessary to remove the rust preventive before the equipment is put into operation.

The following characteristics limit

Selected List of Government Specification Rust Preventives

Specification No.	General Description	Non-Volatile Material, Per Cent	Method of Application	Application Temperature, Deg. F.	Film Type or Thickness, in.	Drying Time	Protection	Remarks on Uses
OIL TYPES								
USA 2-122	Oil, Lubricating Preservative Medium	98	Dip, brush, spray	60-120	Oil, non-drying thin film	No-drying (SAE 30)	Humidity—300 hr., 100 deg. F., Salt water immersion 20 hr.	Highly finished surfaces, requires sealed pack.
14-0-17	Oil, Lubricating Preservative Medium	98	Dip, brush, spray	60-120	Oil, non-drying thin film	No-drying (SAE 30)	Same as above	Same as above, acid-neutralizing.
OS 1383	Oil, Lubricating Preservative Medium	98	Dip, brush, spray	60-120	Oil, non-drying thin film	No-drying (SAE 30)	Humidity 200 hr., 100 deg. F., Salt water immersion 20 hr.	Same as above.
OS 1382	Oil, Lubricating Preservative Light	Approx. 98	Dip, brush, spray	60-120	Oil, non-drying thin film	No-drying (SAE 10)	Humidity 200 hr., 100 deg. F., Salt water immersion 20 hr.	Lubrication and protection of small arms (—50 deg. F. pour point).
OS 1381	Oil, Lubricating Preservative Special	Approx. 98	Dip, brush, spray	60-120	Oil, non-drying thin film	No-drying (SAE 10)	Same as OS 1382	Aircraft guns (—70 deg. F. pour point).
USA 2-120	Oil, Engine Preservative	Approx. 98	Dip, brush, spray	60-120	Oil, non-drying thin film	No-drying (SAE 10)	Humidity—200 hr., 100 deg. F.	Machine guns and small arms—penetrating oil.
AXS 934 Grade II	Oil, Engine Preservative	98	Dip, brush, spray	60-120	Oil, non-drying thin film	No-drying (SAE 30)	Humidity—200 hr., 100 deg. F., Salt water immersion—20 hr.	For internal combustion engines (except aircraft) as a lubricant and preventive against corrosion caused by humidity, moisture condensation and acidic products of combustion on internal metal surfaces, reduction gear, pumps, etc.
AXS 934 (Rev. 1) Grade I	Compound Rust Preventive Thin Film	Approx. 30	Dip, brush, spray	40-95	Oil, non-drying thin film	Never sets	Same as AXS 934, GRADE II	Same as AXS 934, GRADE II.
AN-VW-C-576a	Compound Corrosion Preventive Aircraft Engine	95	Blending 25 per cent with lubricating oil	60-120	Oil, non-drying thin film	No-drying	Humidity—150 hr. at 120 deg. F.	For use on corrosion surfaces on interior of machinery laid up under cover which in normal operation are not in contact with water or steam and for displacing water and to inhibit further corrosion of machinery which has been submerged.
SOLVENT TYPE — DRY FILM								
52-C-18 Grade I	Compound, Rust Preventive, Thin Film (Polar Type)	Approx. 50	Dip, brush, spray	40-95	Dries to semi-hard film thin coat	Sets to permit handling in 24 hr.	Salt spray—4 weeks	For use on non-critical surfaces exposed to severe outdoor weather conditions.
AXS-573 (Rev. 1)	Compound, Rust Preventive, Thin Film	Min. 40	Dip, brush, spray	40-95	Dry thin film thick coat	Sets to permit handling in 24 hr.	Weather—50 days humidity—20 per cent salt spray—30 days	Ferrous and other corrosion metals in either outdoor or indoor exposure and during domestic and overseas shipment.
AN-C-52a Type I	Compound, External Surface Corrosion Preventive	Min. 50	Dip, brush, spray	70-95	Dries to hard film approx. 0.001 in.	Sets to permit handling in 24 hr.	Humidity—4 weeks, 120 deg. F.	All purpose rust preventive for ferrous and nonferrous metals.
PETROLATUM GREASE — THIN FILM								
52-C-18 Grade II	Compound, Rust Preventive, Thin Film (Polar Type)	Approx. 40	Dip, brush, spray	40-95	Soft greasy Max. 0.001 in.	No-drying Liquid	Salt spray—2 weeks Wathrometer—25 days	Soluble in lubricating oil. Good on critical surfaces. For use on ferrous and other corrosion metals in either outdoor or indoor exposure and during domestic and overseas shipment.
AN-C-124 Type I	Compound, Soft Film, Corrosion Preventive	No requirements	Dip, brush, spray	70-95	Soft greasy Approx. 0.002 in.	Sets in about 48 hr.	Humidity—4 weeks, 120 deg. F. 20 per cent salt spray—2 weeks	Indoor protection only, fairly easy to remove.
PETROLATUM GREASE — THICK FILM								
AN-C-124 Type II	Compound, Soft Film, Corrosion Preventive	99	Hot dip only	138-180	Soft greasy Approx. 1/32	No-drying	Humidity—4 weeks, 120 deg. F. 20 per cent salt spray—2 weeks	Preservative and lubricant of ball and roller anti-friction bearings.
AXS-1347	Compound, Rust Preventive, Special	98	Hot dip	150-170	Soft greasy Approx. 1/32	No-drying	100 per cent humidity, 100 deg. F., 2 weeks	Bearings (this type may also be oil type).
USA 2-82c	Compound, Rust Preventive, Heavy	Approx. 98	Dip, brush, spray	175-200	Solid greasy Thick film	No-drying	Humidity—19 hr. Ultra-violet—7 days Wathrometer—30 days	Protection for highly finished metal surfaces 1 year outdoors 10 years in floor where storage temperatures up to 150 deg. F. may be encountered.
USA 2-121	Compound, Rust Preventive, Medium	Approx. 98	Dip, brush, spray	160-170	Greasy but firm thick film	No-drying	Humidity—10 days and 14 days, 20 per cent salt spray	Used as a rust preventive for protection of highly finished and operating metal surfaces, for indoors, where corrosion preventive period of several years may be necessary and where temperatures up to 135 deg. F. may be encountered. Must be overwrapped.
USA 2-84B	Compound, Rust Preventive, Light	98	Dip, brush, spray	185-195	Soft greasy thick film	No-drying	Humidity—300 hr. at 100 per cent	One year indoor—Melts 120 deg. F. Must be overwrapped.
OS 627	Gun Slushing Compound, Grade A	Approx. 98	Brush, spray	150-160	Firm thick grease film	No-drying	Complete protection of gun tube—1 year outdoors, 120 deg. F. Humidity—4 weeks, 120 deg. F. Salt—4 weeks, Wathrometer—1 yr.	Protection of steel out of doors under severest conditions. Hard to remove.
AN-C-52a Type II	Compound External Surface Corrosion Preventive	Min. 99	Hot dip only	170-210	Firm thick grease film	Sets up on cooling at 70 to 90 deg. F.		All purpose for ferrous and nonferrous metals. Requires overwrap.

* NOTE: Specification No. AXS-574 (Rev. 2) not listed above is superseded by 2-122.

the efficacy of this class of products:

a. The higher viscosity materials require some time to drain thoroughly so that excess oil will not drip off.

b. The oil film is not resistant to abrasion and may be wiped off during handling.

c. They will not withstand severe conditions of exposure and are usually used for short periods of time or when there is additional wrapping and packing to assist in rust protection.

2. *Solvent Cutbacks*—This group includes products which contain a volatile solvent. The purpose of the solvent usually is to make cold rather than hot application possible and to reduce the thickness of the protective film. These solvent cutback materials cover a wide range of application and may be divided into sub-groups as follows:

a. *Hard Film*—Upon evaporation of the solvent, the products in this group form a dark-colored hard abrasion-resistant coating which will withstand the most severe conditions of exposure over long periods of time.

b. *Soft Film*—Products form a thin grease-like coating which has some resistance to abrasion and is more readily removed than the hard film products. Some of the soft film solvent cutbacks will give excellent protection in outdoor storage over moderate periods of time, whereas others are intended only for protection in indoor storage or of packaged or internal surfaces. Some products falling into this group are speciality items intended for neutralization or removal of fingerprints.

c. *Oily Film*—These products are generally manufactured for specific application where the protection requirements are not severe and a very thin, easily removed protective coating is desired. Many of the special fingerprint neutralizers or removers fall into this classification. Solvent cutback rust preventives have the following advantages:

a. They are fluid at room temperature and are very easy to apply.

b. The protective film is usually quite thin and not objectionable to handle.

c. The hard film materials and some of the soft film materials will withstand very severe exposure conditions.

d. The oily film and some of the soft film materials need not be removed before putting the equipment into service.

Some limitations of the solvent cutback products are as follows:

a. Most materials have a minimum flash point of 100 deg. F.; however, certain fire hazards are involved.

b. A certain amount of time is required for the solvent to evaporate and the film to set up before it can be handled.

c. The hard film materials may be somewhat difficult to remove and for this reason, cannot be used on intricate or inaccessible surfaces.

d. The oily film materials and some of the soft film materials will not withstand severe conditions of exposure.

3. *Solid or Semi-Solid Rust Preventives*—These materials are usually manufactured from petrolatum or wax bases. In general, the heavier materials afford the best protection and some of them may be used for severe exposure condition over long periods of time, whereas the lighter grades are intended primarily for pro-

Some difficulties in handling these products may be noted:

a. They must be heated above their melting point for application; hence, special equipment is required.

b. The protective coating may be rather thick and, hence, objectionable to handle.

Service Classification

As noted above, some manufacturers are presenting their products to industry according to the service for which they are intended. Where the product is acceptable under government specification, the specification number is usually given. Petroleum-base rust preventives are segregated for (1) outdoor exposure, (2) indoor exposure, including packaged parts and interior surfaces of machinery, (3) temporary protection and (4) rust preventive lubricants. These will now be discussed in this order:

1. *Outdoor Exposure*—Products intended for this service must be of such a nature that they will with-

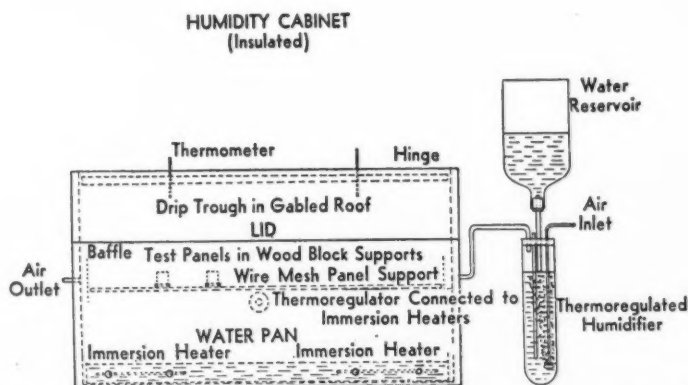


FIG. 1—The humidity cabinet test supplies an especially accurate indication of the protection against rust provided by various coatings in shipment or storage overseas in the tropics and sub-tropics. The atmosphere within this cabinet is controllable and generally maintained at 100 deg. F. with 100 per cent relative humidity.

tection in indoor storage or protection of packaged parts. On the other hand, the heavier materials are more difficult to remove and should not be applied on intricate parts or inaccessible surfaces. The protection afforded is largely dependent upon the temperature and method of application due to wide variations in the thickness of the applied film.

The advantages of the solid or semi-solid rust preventives are as follows:

a. These products, particularly the harder grades, are resistant to abrasion or impact and will give excellent protection under severe exposure conditions.

b. The film thickness and, consequently, the protection afforded may be varied by controlling the dipping temperature and time.

stand the effects of rain and snow, as well as sunlight. They must also have good resistance to abrasion. Such products are frequently used on contractor's equipment, farm machinery, fabricated iron or steel parts, pipe, fittings and exterior surfaces of machinery. They may also be used to "touch up" small areas on steel bridges, tanks, or steel structures. The products most usually used for such service are the hard film solvent cutbacks, the harder grades of the solid types, and to some extent, the soft film solvent cutbacks.

2. *Indoor Exposure* (including packaged parts and interior surfaces of machinery)—Materials in this group must have a high degree of protection against high humid-

ities and corrosive atmospheres but do not have to withstand the beating effects of rain and snow. In many instances good abrasion resistance is required. In the case of packaged parts, the type of package will greatly affect the requirements of the rust preventive. These products are frequently applied to replacement parts, finished machine parts, subassemblies and interior surfaces of machinery. The products frequently used are those of the oil type, the soft film and oily solvent cutbacks and the softer grades of the solid materials.

3. Temporary Protection—These products are intended to protect surfaces for relatively short periods of time in indoor storage. They are most commonly used on parts between machining operations or on parts or subassemblies awaiting final assembling and application of a heavy duty preservative. They may also be used on tools, gages, micrometers and the like, which are subject to intermittent handling,

As this last named group is of special interest to the industry, some of the circumstances which led to its development may be detailed. The goal of oil refiners during past years has been to develop lubricating oils having great resistance to oxidation and good emulsibility characteristics. However, in attempting to reach this goal other important factors have often been disregarded. By utilizing improved refining methods, oils have been produced which afford excellent service over long periods of time without forming the sludge deposits or organic acids characteristic of the older oils. On the other hand, these highly refined oils often lack the necessary wetting ability to prevent moisture from penetrating the oil film, thus permitting rusting.

It has been a difficult problem to produce an oil which retains the advantages of high refinement and at the same time has sufficient metal wetting properties to protect the metal parts. Many materials when added to an oil will prevent rust but, until recently, all such known compounds

The inhibitor does not affect the stability of the oil in service and actual field trial has proven that oils containing this inhibitor resist foaming and emulsification.

The effectiveness of rust inhibited oils has been proven in actual service covering a wide range of applications. One large plant made a rather extensive study of the maintenance and lubrication of ball and roller bearings in their operating equipment. They found that a large number of failures were occurring on bearing surfaces lubricated with straight mineral oils due to rusting of the balls and races. A more detailed study revealed that these failures occurred most frequently on equipment in intermittent operation. In the same plant similar rusting troubles were encountered on the walls of air-operated pistons in intermittent service and on the interior surfaces of lubricator reservoirs. When rust inhibited oils were installed in this equipment, practically all of the failures due to rust were eliminated immediately.

Identifying the Rust

Rust prevention gets off to a good start if types of rust occurring are correctly identified as to cause. Fundamentally, rusting is a process of more or less rapid oxidation depending upon the severity of the oxidizing influences. The most usual contributing factors are:

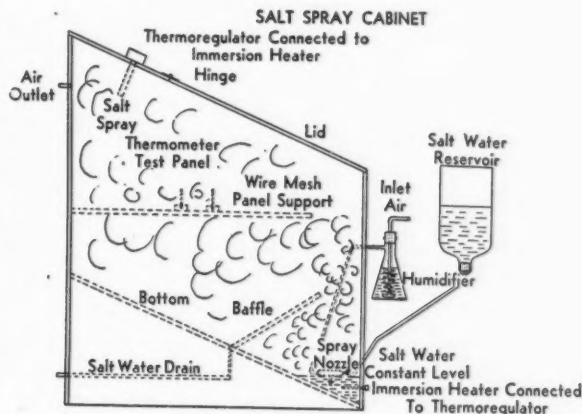
- (a) Oxidation in the presence of excessive humidity
- (b) Corrosive chemicals in the atmosphere, and
- (c) Stray electric currents (electrolysis).

Regardless of the quality of whatever rust preventive material may be used, poor application or careless handling of the rustproofed article, may result in rusting due to the fact that the rust preventive seal has been broken and oxygen and moisture have been allowed to contact the surface.

Moisture and air must be present for most types of rust to develop. Rust is usually reddish-brown in color, although sometimes, especially between sheets of oiled steel, it may assume a vari-colored hue when chemical reactions other than oxidations are involved. Stray currents usually result in pitting which may or may not be accompanied by other forms of rust.

The various types of rust which can form on steel surfaces can be cataloged according to appearance. An experienced steel man usually can determine the cause of rust formation by the peculiar design which the rust

FIG. 2—Tests with this apparatus are of service in predicting whether a given rust preventive material will stand up under such salt water conditions as might be experienced in transoceanic shipment, storage in coastal areas, or in amphibious operations near seaboard installations. A 20 per cent salt water solution is used to subject the coated test panels continuously to a fine salt spray.



providing they have fingerprint suppressing properties. The products most commonly used are the oily film solvent cutbacks, light grades of oil rust preventives and some soft film solvent cutbacks. Some rust preventives falling into this classification have the added property of removing perspiration residues or fingerprints and at the same time, providing temporary protection.

4. Rust Preventive Lubricants—This group includes products which are combination rust preventives and lubricating oils. They must afford protection against high humidity and have other characteristics, such as oxidation stability, low pour point, high viscosity index.

were entirely unsatisfactory because they promoted oxidation, foaming, and the formation of oil-water emulsions. In its turbo and Tellus oils, the Shell Oil Co. was the first to be successful in synthesizing a rust inhibitor which had none of these harmful effects. This inhibitor is a non-metallic compound somewhat similar to petroleum in its chemical composition, which is added to the oil in extremely small quantities. Its nature is such that it has a strong affinity for metals and forms a microscopically thin protective film on oil covered parts. The thin film or rust inhibitor acts as a cementing agent and holds a thicker film of the lubricating oil to the metal, thus excluding both air and moisture and preventing the formation of rust.

assumes, and is able to correct the conditions which are at fault.

Red rust due to oxidation and moisture is generally found on any unprotected steel surfaces which have been exposed to oxidizing influences for any length of time. It may develop in the storage yard, in the store room or while materials are being shipped or used if no rust preventive coating has been applied. In the steel industry this type of rust can occur on sheet steel, the surfaces of which have received no protection or inadequate protection from an unsuitable type of rust preventive.

When the protecting film is inadequate, rust forms on the parts, aggravated by the excessive temperature variations which cause moisture condensation, prevalent in unheated steel mills, warehouses and storage sheds.

Red rust will occur on any steel surface which has been exposed to moisture without proper drying immediately thereafter. It may result from contact of steel parts machined with soluble oil. It may be caused on sheet steel where water has been used for cleaning purposes.

Even though heavy compounds have been used for the protection of articles, red rust can occur if the compound has been carelessly applied or the film removed by exposure to rough handling. This type of rust is particularly liable to occur under exposure to salt water.

Rusting is frequently noted in hydraulic or other circulating oil systems where condensation within oil tanks or entrance of water from some outside source may result in entrainment of moisture in the lubricating oil with consequent rusting of parts throughout the oil system. Rusting because of the collection of moisture also frequently occurs in various bath, ring, or splash lubricated mechanisms when they are operated intermittently or when they are subjected to changes of ambient temperature.

Rust due to corrosive chemicals may be vari-colored according to the type of chemicals involved. Normally, the steel is not intentionally exposed to corrosive chemicals. Such exposure results from chemical vapors in the air which are unavoidable.

Acidic atmospheres are frequently encountered in steel mills and some other industries, and are a common cause of this type of rust. Acidic influences may also develop from material used during the course of processing or assembly.

After the pickling operation, if thin streaks of salt remain on the steel

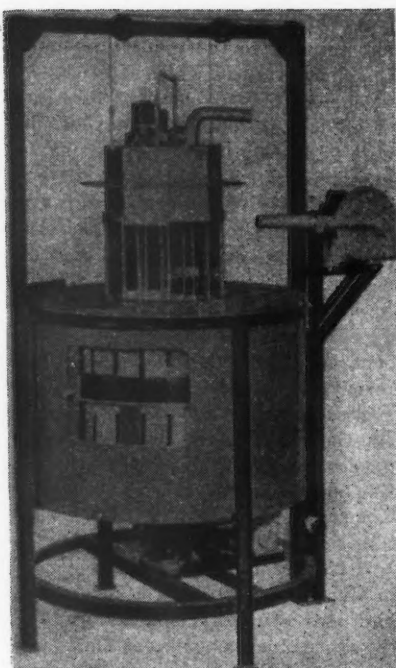


FIG. 3—The exposure of coated steel or iron panels to ultra-violet light within this testing apparatus, known as a weatherometer, will quickly determine the ability of a given compound to withstand intense sunlight. The equipment also has a spray section to simulate rain.

Figs. 1, 2 and 3, courtesy of Shell Oil Co., Inc.

after a lime dip, even though the steel surface may be dried by heating, these salts will tend to retain or will absorb sufficient moisture to cause rust formation directly under the streaks of salt.

Yellow streaks will sometimes be found on steel which has been stored for some months. These may be caused by the corrosive action of some fatty acid which has resulted from improper use of fatty material in a rust preventive. Marks of the type are difficult to remove. If they are on steel stock which is to be enameled white, they will show through the enamel coating.

Mineral acids also may cause rust of a grayish, cloudy nature. This type of rust has been noticed on steel coils within a few hours after they have been slushed with unsuitable or inferior materials.

Pin points of rust can occur due to inadequate cleaning of steel which has resulted in leaving small specks of scale or slag on the surface. They may result in minute rust spots, even though covered with a rust preventive material which would have been adequate for properly cleaned steel.

Fingerprints can also be the cause of chemical reaction on the surface steel. When such prints are not com-

pletely removed, rusting is inevitable. They can be removed by washing with caustic or sodium phosphate, or may be avoided by handling steel articles with clean cotton gloves.

Stray currents are occasionally found in assembled machines or pipe lines. Rusting caused by these currents results in definite pitting at the point where the current leaves the metal. This can occur in the absence of oxidation and is usually readily identified.

The Protective Film

In order to establish the optimum characteristics for application, not only actual consistency but spreadability, wetting properties, surface tension, penetration and other factors have to be considered.

Inasmuch as film thickness is contingent upon ease of application and is definitely related to consistency and temperature, some laboratory data developed by the Texas Oil Co. on one of the outstanding non-drying rustproof compounds is of interest. The method of procedure involved immersion of steel plates of uniform size in the material at predetermined temperatures for 1 sec. and 30 sec. periods. The following data are significant:

Film Thickness on $\frac{1}{8}$ Inch Steel Plate

Temperature of Rustproof Compound Bath Deg. F.	Temperature of Steel Plate and Immersion Time	
	77 Deg. F. 1 Sec. Thickness, in.	85 Deg. F. 30 Sec. Thickness, in.
150	0.039	0.007
175	0.019	0.005
200	0.018	0.004
225	0.018	0.004
250	0.018	0.003

Objects dipped when cool or for an insufficient length of time may be coated too heavily. Objects dipped for too long a time at too high a temperature may be coated too lightly. In other words, the film thickness depends on the size and temperature of the object to be coated, the temperature of the bath and the time of immersion.

The lighter grades of these compounds can be applied by brushing or swabbing at ordinary summer temperatures. The heavier grades are frequently cut back with a solvent to enable brush application. Most of these products are readily diluted with petroleum solvents to a consistency suitable for spraying if desired. Evaporation of the solvent leaves a residual

rust protecting film of the same quality as obtained by hot dipping.

Where a rustproof compound is to be applied over existing rust (without cleaning to fresh metal) a thicker than usual application is necessary because some of the rustproof compound must penetrate the rust layer. Then it can function most effectually as a preventive of further rusting. On the other hand, wherever time and labor facilities will permit, extremely heavy rust scale should be removed by such means as wire brushing, chipping, grinding with coated abrasives, or pickling before the metal is treated against rust.

On account of the necessity for removal of rustproof compounds from many pieces of equipment before placing in service, easy removal with readily available petroleum solvents such as kerosene is considered a requirement. Most of the products on the market are quite satisfactory in this respect.

Safety in handling of any type of rust preventive must always concern the user. Wherever heating is necessary to reduce the fluidity sufficiently to permit dipping, swabbing or spraying, the flash point of the product should be well above the maximum temperature to which it must be heated. Quite naturally, the heavier the product, the higher the preheat temperature may have to be. In the case of materials applied cold, which contain solvents, the flash point should be above 100 deg. F.

If rusting has occurred in spite of the use of some rust preventive material, a complete investigation should be carried out in a logical and orderly manner, as suggested below:

1. Obtain samples of the original unused rust preventive for laboratory analysis to determine if any moisture or other contaminant is present.

2. Obtain samples of rust preventive from the steel involved, also samples of the steel showing rust or other deposits. A laboratory analysis of the rust preventive and of the deposit will usually indicate the cause.

3. Observe the processing to which the steel has been subjected prior to application of rustproofing. Observe the storage and shipping conditions after the steel has been coated; look for atmospheric condensation or contact with moisture during the course of handling.

4. Observe methods of handling the rustproof materials. Careless handling often may cause an other-

TABLE II

Partial Listing of Rust Preventives With Manufacturers and Brand Names*

Specification No.: U.S.A. 2-82C or AN-C-52 (Type II)

Brand Name or Sample Number	Manufacturer
Anti-Corrosive Compound No. 1593	American Oil & Supply Co., Newark
Rustavoid No. 585 & No. 5855	F. E. Anderson Oil Co., Portland, Conn.
No. 232659	The Atlantic Refining Co., Philadelphia
Rust Preventive Compound A, S & M	Battenfeld Grease & Oil Co., Kansas City
Cities Service Anti-Corrode 101	Cities Service Oil Co., Chicago
Rust Preventive Compound, Heavy	Dearborn Chemical Co., Chicago
L-920	Frost Paint & Oil Co., Minneapolis
Gulf Rust Preventive Compound 2-820	Gulf Oil Corp., Pittsburgh
70115C	R. M. Hollingshead Corp., Camden, N. J.
Cosmoline 2-82C	E. F. Houghton & Co., Philadelphia
No. 282-C	Industrial Products Mfg. Co., N. Kansas City
Cor-Re-Lab No. 109	June & Co., Detroit
G-2	H. A. Montgomery Co., Inc., Detroit
M.X. No. 8714 D.D.	Motor State Oil & Grease Co., Jackson, Mich.
Nox-Rust 101	Nox-Rust Corporation, Chicago
370 Marathon Rust Preventive	The Ohio Oil Company, Robinson, Ill.
Rust Preventive Compound No. 11410	Presstite Engineering Co., St. Louis
D-25-F	Scholler Bros., Inc., Philadelphia
V-7153 Shell Ensis Compound 303	Shell Oil Co., New York
Corol 145 and 145X	Simoniz Co., Chicago
S/V Armvac Compound 82	Socony-Vacuum Oil Co., N. Y.
Non-Rust Preventive Compound	Sta-Vis Oil Co., St. Paul, Minn.
SR-4504	Standard Oil Co. (Indiana), Chicago
Rust Ban 327 and WS 391	Standard Oil Co. of N. J., N. Y.
Penola 145 and WS 391	Penola, Inc., Pittsburgh
Rust Ban 327 and WS 391	Humble Oil & Refining Co., Houston, Texas
Rust Ban 327 and WS 391	Carter Oil Company, Tulsa, Okla.
Rust Ban 327 and WS 391	Colonial Beacon Oil Co., Boston
Rust Ban 327 and WS 391	Gilmore Oil Co., Los Angeles
Rust Ban 327 and WS 391	Standard Oil Co. of La., Baton Rouge, La.
Rust Ban 327 and WS 391	Standard Oil Co. of Pa., Philadelphia
Rust Ban 327 and WS 391	The Texas Co., New York
Texaco Rustproof 2-82c	Tretolite Co., Webster Groves, Mo.
Procoil 30, 31, 32	Valvoline Oil Co., Cincinnati
Valvoline X-Rust 957	

Specification No.: U.S.A. 2-121 (formerly AXS-1001) or U.S.N. 52-C-18
Grade II or AN-C-52 Type II

Rustavoid No. 1001B	F. E. Anderson Oil Co., Portland, Conn.
Antico 40-46	Antico Products Co., Baltimore
Cities Service Anti-Corrode No. 101-A.	Cities Service Oil Co., Chicago
Compound H	
No-Ox-Id 596	Dearborn Chemical Co., Chicago
Gulf Rust Preventive Compound AXS-1001	Gulf Oil Corp., Pittsburgh
Hollingshead 60657-A	R. M. Hollingshead Corp., Camden, N. J.
Cosmoline AXS-1001	E. F. Houghton & Co., Philadelphia
Kant-Rust L-149	Lehigh Chemical Products Co., Allentown, Pa.
F-1	H. A. Montgomery Co., Inc., Detroit
Nox-Rust 103 and 202	Nox-Rust Corp., Chicago
383 Marathon Rust Preventive	The Ohio Oil Co., Robinson, Ill.
Tectyle No. 502	Potomac Chemical Co., Washington
V-7210 Shell Ensis Compound 302	Shell Oil Co., New York
No. 857, No. 860, No. 871E, No. 873, and	The Simoniz Co., Chicago
No. 865	
SR-4445	Standard Oil Co. (Indiana), Chicago
Rust Ban 349 and WS 701	Standard Oil Co. of N. J., New York
Rust Ban 349 and WS 701	Penola, Inc., Pittsburgh
Rust Ban 349 and WS 701	Humble Oil & Refining Co., Houston, Texas
Rust Ban 349 and WS 701	Carter Oil Company, Tulsa, Okla.
Rust Ban 349 and WS 701	Colonial Beacon Oil Co., Boston
Rust Ban 349 and WS 701	Gilmore Oil Co., Los Angeles
Rust Ban 349 and WS 701	Standard Oil Co. of La., Baton Rouge, La.
Rust Ban 349 and WS 701	Standard Oil Co. of Pa., Philadelphia
Rust Ban 349 and WS 701	The Texas Co., New York
Rustproof Compound H (Hot Dip)	Valvoline Oil Co., Cincinnati
Valvoline X-Rust 1095, and Tectyl No. 502	Zophar Mills, Inc., Brooklyn
Zophite "M" Compound	

Specification No.: U.S.A. 2-84b (Amend. 1)

R.P. 284	American Lubricants, Inc., Buffalo
Amovis No. 1540	American Oil & Supply Co., Newark
Rustavoid No. 554, 555A	F. E. Anderson Oil Co., Portland
No. 240276A	The Atlantic Refining Co., Philadelphia
Rust Preventive Compound, Light	Battenfeld Grease & Oil Co., Kansas City, Mo.
Cities Service Anti-Corrode 102	Cities Service Oil Co., Chicago
No-Ox-Id 580	Dearborn Chemical Co., Chicago
Gulf Rust Preventive Compound No. 2-84b,	Gulf Oil Corp., Pittsburgh
S-2371, S-2372	
70342C	R. M. Hollingshead Corp., Camden, N. J.
Cosmoline 2-84b	E. F. Houghton & Co., Philadelphia
Cor-Re-Lab No. 122	June & Co., Detroit
RP No. 1260	L. R. Kerns Co., Chicago
Rust Preventive Compound L-140	Lehigh Chemical Products Co., Allentown, Pa.
Anti-Rust No. 6 and 6-E	H. A. Montgomery Co., Inc., Detroit
Nox-Rust 102 and 3877	Nox-Rust Corp., Chicago
371 Marathon Rust Preventive	The Ohio Oil Co., Robinson, Ill.
D26-1B	Scholler Bros., Inc., Philadelphia
V-7208 Shell Ensis Compound 301	Shell Oil Co., New York
Rust Preventive 284-1	Sherwood Refining Co., Warren, Pa.
Corol Rust Preventive 122, Corol 671	Simoniz Co., Chicago
S/V Armvac Compound 84	Socony-Vacuum Oil Co., New York
Compound, Rust Preventive, Light	SO-Lo Works, Inc., Loveland, Ohio
Amalite 2-84b	L. Sonneborn Sons, Inc., New York
SR-5466	Standard Oil Co. (Indiana), Chicago
Rust Ban 347	Standard Oil Co. of N. J., New York
Rust Ban 347	Penola, Inc., Pittsburgh
Rust Ban 347	Humble Oil & Refining Co., Houston, Texas

wise satisfactory rustproof material to become contaminated.

5. Set up rusting tests in the plant using the steel and rust preventive material under investigation. These tests can be accelerated if desired.

6. Study the findings of the above in connection with the different types of rust and corrosion commonly found on steel surfaces.

Necessity of Clean Surfaces

It is impossible to over-emphasize the necessity for thorough cleaning. The time and care taken in selecting a proper rust preventive is wasted when the product is applied over a dirty surface. In order to obtain maximum, or even reasonable benefits from various preservative coatings, there should be no contamination whatsoever remaining on the surface to be coated.

As there is no universal method of cleaning applicable to all metals and all conditions, a cleaning method compatible to the surface material must be selected and properly carried out if the coating is to provide satisfactory protection. Should improper or inadequate cleaning procedures be employed, more harm than good may result. For example, although iron and steel castings may be easily cleaned in the normal type of alkaline cleaners, aluminum, magnesium, or zinc base die castings, and their alloys, cannot be cleaned satisfactorily in this solution. However, special cleaners of low alkalinity may be used on these materials under specified conditions.

Special fittings equipped with grommets, nuts equipped with integral fabric or rubber lock washers, cannot be haphazardly cleaned in either these water-soluble alkaline cleaners or other organic solvents, even though under normal conditions solvent cleaning is generally indicated for such parts. Another important addition to this category where alkaline cleaners should not be used are extended lap joints, riveted areas or spot welded sections, as adequate removal of the cleaner may be exceedingly difficult. Where porcelain or paint forms a part of a surface to be cleaned, the use of alkaline cleaning is not recommended unless the cleaner is of a special, low-alkaline variety.

The alkaline solutions are generally satisfactory for the cleaning of iron and steel alloys, and this is especially true of castings, forgings and rough finish surfaces. However, where extremely close tolerances or highly finished surfaces, or both, are indicated, alkaline cleaning is definitely not ap-

Brand Name or Sample Number	Manufacturer
Rust Ban 347	Carter Oil Co., Tulsa, Okla.
Rust Ban 347	Colonial Beacon Oil Co., Boston
Rust Ban 347	Gilmore Oil Co., Los Angeles
Rust Ban 347	Standard Oil Co. of La., Baton Rouge, La.
Rust Ban 347	Standard Oil Co. of Pa., Philadelphia
Texaco Rustproof 2-84b	The Texas Co., New York
Valvoline X-Rust 956	Valvoline Oil Co., Cincinnati
Visconorust 1248	Viscosity Oil Co., Chicago
Specification No.: AXS 673 (Rev. 1, Amend. 2) or U.S.N. 52-C-18 Grade I or AN-C-52 Type I	
Par-Al-Ketone B, Alox 707-35 and 707-40	Alox Corp., Niagara Falls, N. Y.
Par-Al-Ketone B	American Lubricants, Inc., Buffalo
Par-Al-Ketone B, Amovis, and Par-Al-Ketone, Anti-Corrosive No. 1592	American Oil and Supply Co., Newark, N. J.
Antico 40-42	Antico Products Co., Baltimore
Par-Al-Ketone B	U. B. Bray Co., Los Angeles
Cities Service Anti-Corrode No. 106	Cities Service Oil Co., Chicago
No-Ox-Id 405	Dearborn Chemical Co., Chicago
761 (Par-Al-Ketone)	Delta Oil Products, Milwaukee
Par-Al-Ketone B	James W. Doyle Corp., Detroit
Compound, Rust Preventive, Par-Al-Ketone Base	J. L. Fannon Co., Inc., Philadelphia
Hollingshead 6064A-4	R. M. Hollingshead Corp., Camden, N. J.
Cosmoline 945	E. F. Houghton & Co., Philadelphia
Consol PT-11 S1281	International Paint Corp., Baltimore
L. W. 229	S. C. Johnson & Son, Inc., Racine, Wis.
Kendal Rust Preventive, Grade 5 4723	Kendal Refining Co., Bradford, Pa.
Nox-Rust 366 and 369	The McCambridge & McCambridge Co., Baltimore
374 Marathon Rust Preventive	Nox-Rust Corp., Chicago
Tectyl No. 506	The Ohio Oil Co., Robinson, Ill.
Shell Ensis Fluid 205, 207	Potomac Chemical Co., Washington
Corol No. 2100	Shell Oil Co., New York
Trexalin	Simoniz Co., Chicago
Tectyl No. 506	Trautman Chemical Eng. Co., E. Cleveland
Visconorust No. 1259, and Alox 707-35 and 707-40	Valvoline Oil Co., Cincinnati
Washburn No. 2667 Compound	Viscosity Oil Co., Chicago
Witco No. 673	T. F. Washburn Co., Chicago
	Witco Chemical Co., Chicago
Specification No.: U.S.N. 52-C-18 Grade III	
Antico 40-44	Antico Products Co., Baltimore
Brilco No. 3	Brilco Laboratories, New York
Rustgard No. 3	Drigard Products Co., New York
Hollingshead 60632-A	R. M. Hollingshead Corp., Camden, N. J.
Tectyl No. 511	Potomac Chemical Co., Washington, D. C.
SC-565 and Rust Ban 392	Standard Oil Co. of Pa., Washington, D. C.
Tectyl No. 511	Valvoline Oil Co., Cincinnati
Specification No.: AXS-674** or U.S.N. 14-O-17	
L-125 and L-225	F. E. Anderson Oil Co., Portland, Conn.
Cities Service Anti-Corrode 103	Cities Service Oil Co., Chicago
S-2005, Delta Anti-Corrosion Oil Medium No. 760 and No. 771	Delta Oil Products Co., Milwaukee
No. 70383-C	R. M. Hollingshead Corp., Camden, N. J.
Cosmoline 935, 937, 938	E. F. Houghton & Co., Philadelphia
Cor-Re-Lab No. 140 and No. 141	June & Co., Detroit
Kant-Rust L-167	Lehigh Chemical Products Co., Allentown, Pa.
Nox-Rust 212A	Nox-Rust Corp., Chicago
372 Marathon Rust Preventive	The Ohio Oil Co., Robinson, Ill.
D-81-1A and D-81-2D	Scholler Bros., Inc., Philadelphia
V-1042 Shell Ensis Oil 103	Shell Oil Co., New York
Sinclair Rust-O-Lene C	Sinclair Refining Co., New York
Mobil Rustproof 674	Socony-Vacuum Oil Co., New York
SR-5711	Standard Oil Co. (Indiana), Chicago
SR-5711	Standard Oil Co. of N. J., New York
652 Preservative Oil, SAE 30	The Texas Co., New York
Tycol No-Rust-Oil D	Tide Water Associated Oil Co., New York
Red Line X-403	Union Oil Co. of California, Los Angeles
Specification No.: U.S.A. 2-120 (formerly AXS-777) or O.S. 1361, also supersedes AXS-702 (Rev. 1)	
L-143	Alox Corporation, Niagara Falls, N. Y.
Amovis Anti-corrosive Compound 1545A	American Oil & Supply Co., Newark, N. J.
139-1, C-80-3	U. B. Bray Co., Los Angeles
Cities Service Anti-corrode 105	Cities Service Oil Co., Chicago
Delta Experimental No. 741	Delta Oil Products Co., Milwaukee
Gulf Gun Oil AXS-777	Gulf Oil Corp., Pittsburgh
70292-C	R. M. Hollingshead Corp., Camden, N. J.
Cosmoline 936 and 940	E. C. Houghton & Co., Philadelphia
L-126 and L-144	Lehigh Chemical Products Co., Allentown, Pa.
Nox-Rust 218E	Nox-Rust Corp., Chicago
382 Marathon Rust Preventive	The Ohio Oil Co., Robinson, Ill.
V-1077	Shell Oil Co., New York
PD-572B	Socony-Vacuum Oil Co., New York
31450-R	Standard Oil Co. of Calif., San Francisco
SR-5634, SR-5936	Standard Oil Co. (Indiana), Chicago
1193 Preservative Oil	Standard Oil Co. of N. J., New York
1193 Preservative Oil	Penola, Inc., Pittsburgh
1193 Preservative Oil	Humble Oil & Refining Co., Houston, Texas
1193 Preservative Oil	Carter Oil Co., Tulsa, Okl.
1193 Preservative Oil	Colonial Beacon Oil Co., Boston
1193 Preservative Oil	Gilmore Oil Co., Los Angeles
1193 Preservative Oil	Standard Oil Co. of La., Baton Rouge, La.
1193 Preservative Oil	Standard Oil Co. of Pa., Philadelphia
Valvoline X-Rust 1092	Valvoline Oil Co., Cincinnati
Visconorust No. 1255	Viscosity Oil Co., Chicago

Specification No.: AXS-934 (Rev. 1) Grade 1

Brand Name or Sample Number	Manufacturer
Cities Service Anti-corrode 107	Cities Service Oil Co., Chicago
Gulf No-Rust Engine Oil, Grade I	Gulf Oil Corp., Pittsburgh
Cosmoline 946	E. F. Houghton & Co., Philadelphia
Nox-Rust No. 231a	Nox-Rust Corp., Chicago
384 Marathon Rust Preventive	The Ohio Oil Co., Robinson, Ill.
Sultana Rust Preventive Oil, SAE 10	Pure Oil Co., Chicago
Shell Ensis Oil 402	Shell Oil Co., New York
Sinclair Opaline RP, 10	Sinclair Refining Co., New York
Mobil Rustproof 934, Grade 1	Socony-Vacuum Oil Co., New York
SR-5799	Standard Oil Co. (Indiana), Chicago
WS-657 Rust Preventive	Standard Oil Co. of N. J., New York
WS-657 Rust Preventive	Penola, Inc., Pittsburgh
WS-657 Rust Preventive	Humble Oil & Refining Co., Houston, Texas
WS-657 Rust Preventive	Carter Oil Co., Tulsa, Okla.
WS-657 Rust Preventive	Colonial Beacon Oil Co., Boston
WS-657 Rust Preventive	Gilmore Oil Co., Los Angeles
WS-657 Rust Preventive	Standard Oil Co. of La., Baton Rouge, La.
WS-657 Rust Preventive	Standard Oil Co. of Pa., Philadelphia
651 Preservative Oil SAE 10	The Texas Company, New York
Veedol 9341A	Tide Water Associated Oil Co., New York

**Specification No.: AXS 934 (Rev. 1) Grade 2 or AN-VV-C-576(a)
or U.S.N. 14-O-17**

AIM 31	Atlantic Refining Co., Philadelphia
Cities Service Anti-Corrode No. 107A	Cities Service Oil Co., Chicago
Cosmoline 947	E. F. Houghton & Co., Philadelphia
Gulf No-Rust Engine Oil, Grade 2	Gulf Oil Corp., Pittsburgh
Nox-Rust No. 23	Nox-Rust Corp., Chicago
Paragon Rust Preventive, No. 103	Paragon Oil Co., Brooklyn
Sultana Rust Preventive Oil, SAE 30	Pure Oil Co., Chicago
Shell Ensis Oil 401 and V-672 Shell Ensis Oil	Shell Oil Co., New York
Sinclair Opaline, RP, 30	Sinclair Refining Co., New York
Mobile Rustproof 934, Grade 2	Socony-Vacuum Oil Co., New York
SR-5749	Standard Oil Co. (Indiana), Chicago
652 Preservative Oil, SAE 30	The Texas Co., New York
Veedol 9343B	Tide Water Associated Oil Co., New York

*Source of data in this table is a listing (revised as of January 5, 1945) prepared for the Space Control Committee of the Surplus War Property Administration by the War Department, Army Service Forces, Storage Division, in cooperation with the Treasury Department, Navy Department, RFC, United States Maritime Commission, Federal Works Agency and WPB.

**See note under Table I.

plicable. Such parts would include fine ball bearings, super-finished valves, crankshafts, diesel fuel pumps, etc. In such cases, the use of

a petroleum solvent is indicated. Care must be taken with all of these cleaners, however, to make sure that the contamination accumulated within the

solution by successive cleanings never becomes excessive (2 per cent by weight).

Cleaning and rust inhibiting operations are most effective when applied at the proper point in processing. Obviously, the material should be cleaned and rust-proofed in as simple a base unit as possible. Where only visual inspection is required, rust-proofing should be applied after the final machining or forming operation. If gaging or more elaborate testing is involved, the cleaning should be applied as soon as possible after the inspection. Even this, however, does not eliminate the need for temporary rust preventive measures to be taken between machine operations or inspections in order to prevent rust or corrosion during processing so that final cleaning and rust inhibiting for shipment or storage is not made unduly difficult.

For a thorough and concise discussion of cleaning methods and solvents, the reader is referred to the Armed Service Forces Manual M 406—"Corrosion Prevention Processing and Packaging," obtainable from the United States Government Printing Office, Washington. The E. F. Houghton Co., 303 W. Lehigh Avenue, Philadelphia 33, has prepared a book entitled "Rust," which has illustrated data on cleaning and application of rust preventives.

Cut-Off Wheels Bonded With Synthetic Rubber

RECENT reports from abrasive wheel manufacturers indicate that a special-purpose synthetic rubber has been developed which permits the manufacture of fast cutting, long lasting abrasive wheels for the metal working trades. These reports were summarized by Hycar Chemical Co., Akron, Ohio, producer of synthetic rubber from butadiene.

Results of tests conducted by the abrasive division of West Co., Inc., are reported as follows:

"Manganese bronze castings were cut with a natural rubber-bonded wheel making 50 cuts for a total of 562½ sq. in. A Hycar bonded wheel on the same work made 99 cuts for a total of 1013½ in., practically doubling the output. Each wheel was 16 in. in diameter by ½ in. thick, operating at 16,000 ft. per min., 3800 r.p.m. spindle speed."

Tests on aluminum bronze castings showed that the wheel bonded with synthetic rubber cut 141 sq. in. and that the wear was 0.43 sq. in. per sq. in. of metal cut in comparison with a natural rubber bonded wheel which cut 112 sq. in. and showed a wear of 0.627 sq. in. per sq. in. cut.

Bay State Abrasive Products Co. of Westboro, Mass., is another manufacturer which reported that its wheels cut faster and last longer than when bonded with natural rubber.

TESTS made in cutting gates and risers of manganese bronze castings at J. P. Kelly, brass founders, Philadelphia, indicate that synthetic rubber bonded wheels are faster and more durable than those bonded with natural crude rubber.



Cutting and Welding Devices

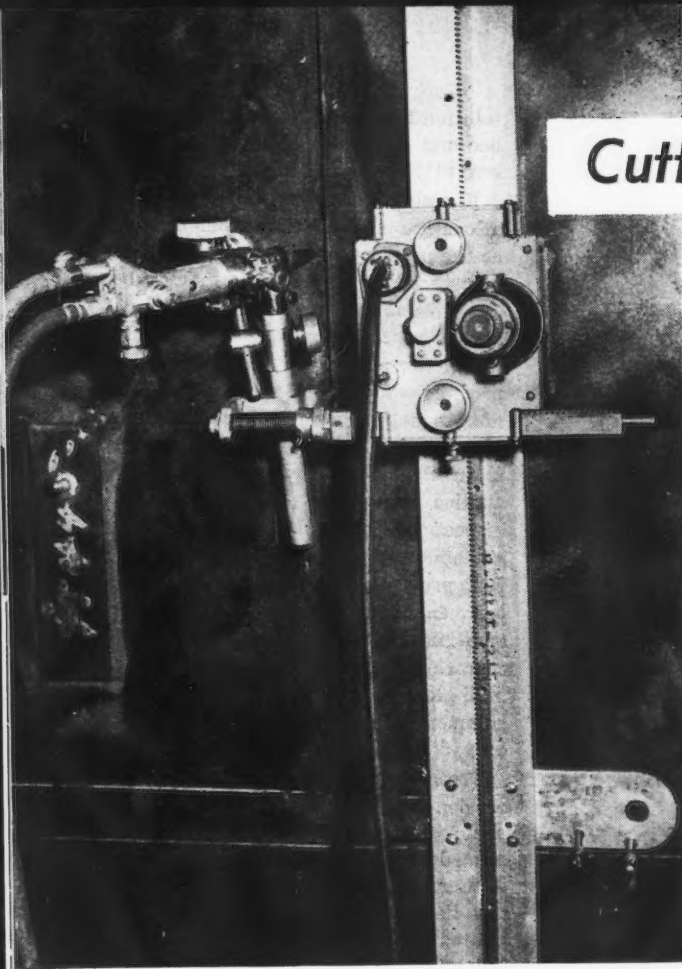


FIG. 1 — Designed for general purpose cutting, this self-contained burning unit cuts and bevels in one operation. Electrically driven and self-propelled, it travels on a geared aluminum track operating either one or two cutting torches simultaneously. Because it will operate in any position, in line production it is used particularly for cutting upright material as shown or for overhead cuts. It is also used for scribing and fitting uneven surfaces. A pantagraph attachment is available, and motor can be furnished to suit current available. Weight of the complete unit, excluding tracks, is 15 lb.

IN its large scale production of vessels and landing craft, Higgins Industries, Inc., New Orleans, has developed numerous special machines and devices to facilitate production line operation.

A natural outgrowth of its days of custom boat building, Higgins today has as wide a range of marine products as any firm in the United States, nearly all of which have been designed by its own engineers. Thus, there is ample engineering talent and shop facilities for production of the specialty tools used in marine development and production. Although this special equipment has been developed for its own use, every item carries a price tag. If any substantial demand is shown, more active marketing efforts may follow.

Most of the equipment shown here

(CONTINUED ON PAGE 62)

RIGHT
FIG. 2 — General purpose cutting unit cutting and beveling in horizontal position. Photograph depicts actual shell plate burning on side of vessel.



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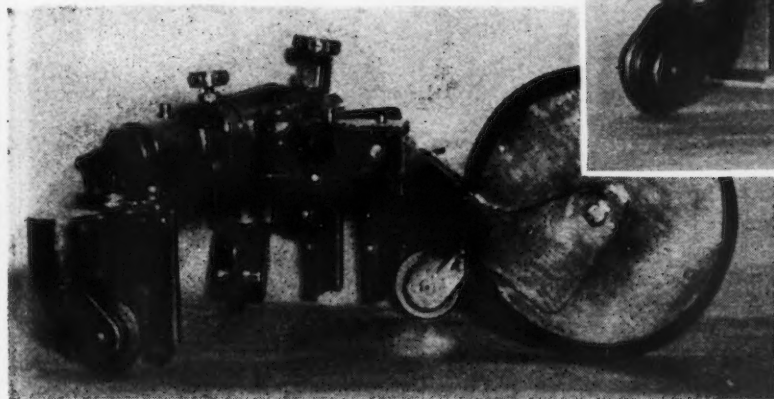
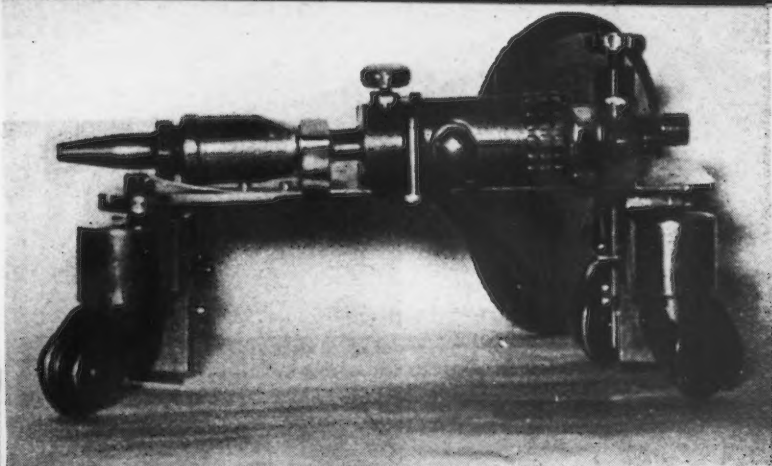


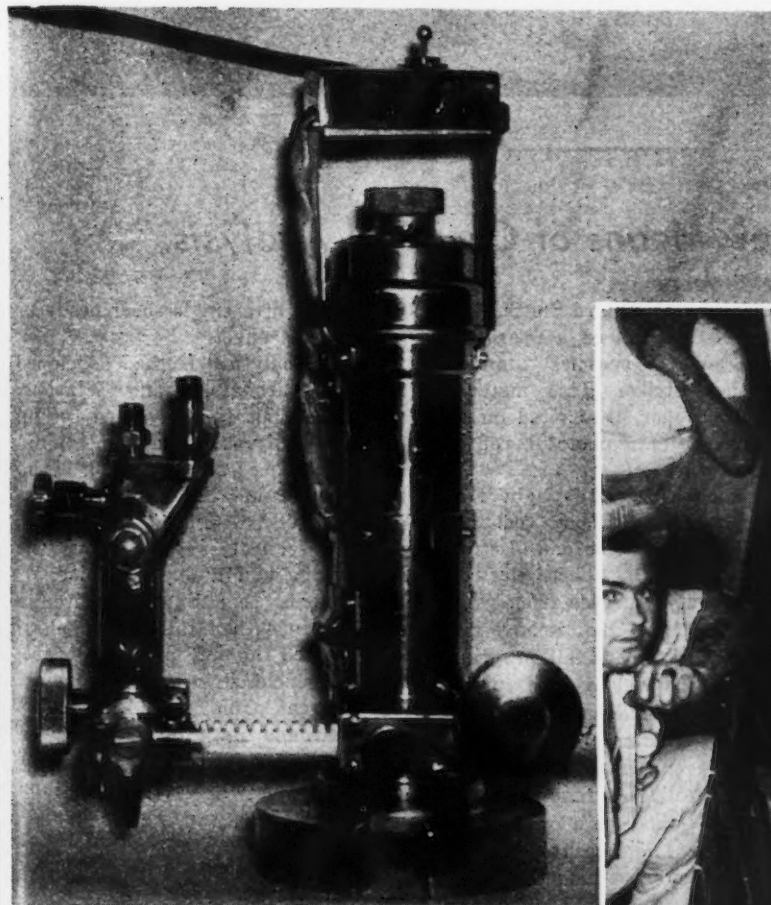
FIG. 4—Side view of cutting-scribing machine shown in Fig. 3



ABOVE

FIG. 3—This cutting-scribing machine is specially adapted for fitting engine beds and for fitting ships' winches and ventilators on ships' decks. Hand propelled, it weighs approximately 4 lb. It is adjustable for heights from $\frac{3}{4}$ in. to $5\frac{1}{2}$ in.

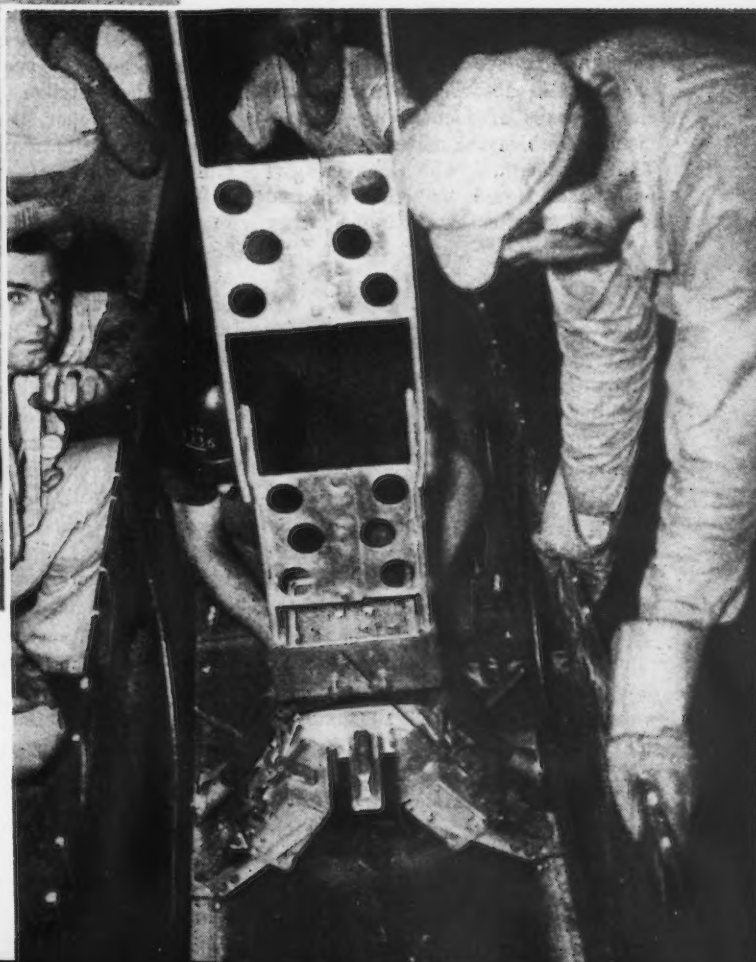
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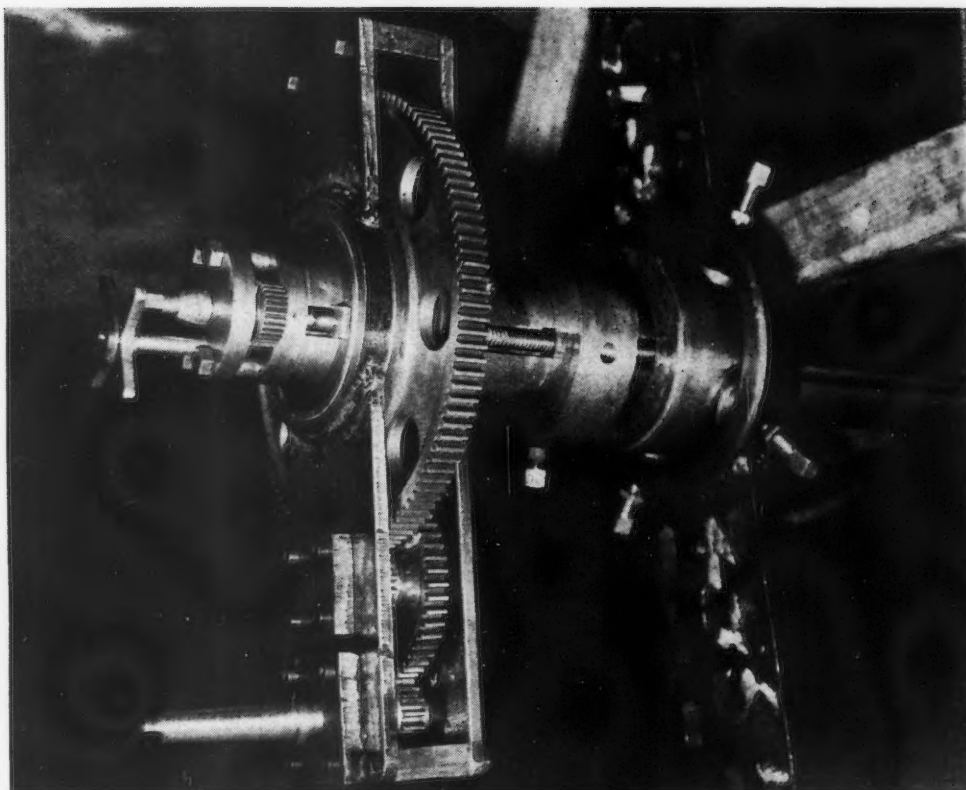
FIG. 5—Circle cutter provides a smooth cut edge with close tolerance through a full-floating torch. No wheel or guide touches the material being cut. The motor drive is through worm gears, and the torch arm is carried on thrust bearings keeping the cut edge smooth. The cutter weighs approximately 10 lb and will cut circles of from 6 to 60 in. diameter.

FIG. 6—Machine designed to fillet weld simultaneously both sides of vertical floors on double bottom fuel tanks. It operates as one machine, both heads starting and stopping at the same time. The wire used is fed from the upright tubes. This automatic welder operates on the submerged melt process and employs a granular flux. The machine is light and portable, and can be carried from ship to ship by one man. It runs without tracks; each head has an independent guide. It can weld inner-bottoms at the rate of 160 ft. per hr.



is in the metal working field, with particular emphasis on burning and welding, but developments in bonded plywood production and fabrication are equally numerous. The cutting machines are covered by patents issued to E. G. Livesay.

FIG. 7—This portable boring bar can be set up on any angle required and is a tool for precision work, including such jobs as boring stern tubes to permit installation of bearings or bushings; also boring steam cylinders, pumps or compressors.



X-Rays Afford New Means of Chemical Analysis

SHOOTING a beam of X-rays through an unknown chemical substance to see how much of the radiation is absorbed is a new and rapid means of identifying the elements of which the material is made. That this method, which can be used with gases, liquids or solids, will find extensive application is indicated by studies in the General Electric research laboratory by Dr. Herman A. Liebhafsky and Dr. E. H. Winslow.

X-rays are intimately related to the inner atom so they furnish a means of counting the number and indicating the kinds of atoms by which they are being absorbed. To a very good first approximation, the count is unaffected by whether the atoms are free or have combined to form molecules of any sort whatsoever; or by whether the sample is hot or cold, solid, liquid or gaseous. Again to a good approximation, an oxygen atom will have the same absorption for X-rays be it free, or in the oxygen molecule, or in liquid water, ice, or steam, or in sugar or in sand.

X-ray absorption as an analytical method is made practicable by a photoelectric X-ray intensity meter developed by another GE research labora-

tory scientist, H. Millard Smith. The invisible X-rays fall on a fluorescent material, which becomes luminous where they strike. This material, called a phosphor, is painted on the glass envelope of a phototube of the multiplier type.

With such a tube the light from the phosphor falls first on a sensitized surface within the tube and electrons are emitted from it. These electrons fall on a second surface from which still more electrons are discharged in larger quantities. They fall on a third surface and the yield is still further increased. Then even more stages are used. The electrons are multiplied and those from the last stage result in a small electric current which can be amplified still more with other electron tubes, and measured with an appropriate meter. Amounts of light with energy equal to a 10 billionth of a watt can be measured easily and accurately in this way.

The photoelectric meter can measure very weak intensity X-rays and also can detect very slight variations in their intensity. For example, if the X-rays are passed through a pile of 100 sheets of paper, the difference in absorption caused by the addition

or removal of a single sheet produces a noticeable effect.

In the analytical method developed by Drs. Liebhafsky and Winslow, which has thus far only been set up experimentally, the solid or liquid sample is placed in a glass cell $\frac{3}{4}$ in. in diameter and 6 in. long. For gases a 2 ft. cell is employed. The cell is in a vertical position above the X-ray tube and a narrow pencil of the rays is sent upwards through it. The rays then fall on the phosphor around the multiplier phototube, which is enclosed in a lead housing. The current from the phototube is amplified and its intensity read on a meter. Comparisons are made of the absorption of the cell with and without the sample. Filters made of various metals can be placed in the X-ray beam to secure radiation of different wavelengths.

Dr. Liebhafsky says that chemical problems vary so greatly that it is difficult to predict the particular applications which this new method of analysis is likely to have. However, enough work has already been done in the General Electric research laboratory to show that for certain types of problems it will have clear advantages over older methods.

MAGNESIUM ALLOY

Aircraft Casting Inspection

... Gas bubbles entrapped below the surface of the casting are often protected by a tough oxide skin from the effect of the sand blast. The author describes a method of distinguishing color patches following a chrome pickle treatment which leads to the detection of such cavities.

THE discontinuities common to magnesium alloy castings used so extensively today in combat aircraft require rigid inspection at the source of fabrication if quality is to be controlled to the satisfaction of producers of aircraft and if rejections are to be held to a minimum. This brief study tends to point out the importance as well as the economy of a complete inspection following the surface coating operation.

In order to provide a surface to which paint will adhere and be somewhat more resistant to corrosion than the natural surface of the metal, most magnesium alloy castings are given a chrome pickle treatment as a final operation in the foundry.

After the castings have had their final heat treatment they are sand blasted in order to remove any oxide coating which might have been formed during heat treatment and to provide a more uniform surface. It will be shown here that the abrasive cleaning operation does not always remove all of this coating.

A sand blasted surface has a lowered corrosion resistance because it consists of a layer which has been cold-worked and which has in turn been left with internal stresses. Hence, it is full of microscopic crevices. It is necessary therefore that this surface be removed before the castings are given a final acceptance stamp.

As a rule this is accomplished by immersing the castings in 3 per cent sulphuric acid bath for a period of sufficient length to remove approximately 0.002 in. of metal from each surface. When this has been accomplished the castings should immediately be rinsed in cold water at a temperature not higher than 65 deg. F. The acid pickle bath should be kept at correct strength and this can

By ROBERT TAYLOR
*Foundry Control Consultant,
Spokane, Wash.*

be determined without extensive laboratory equipment merely by ascertaining the number of seconds of immersion required to reduce the diameter of an abrasively treated cylindrical cast test bar by 0.004 in. A good interval would be from 15 to 30 sec. Should the time exceed the latter, additional acid should be added to the bath.

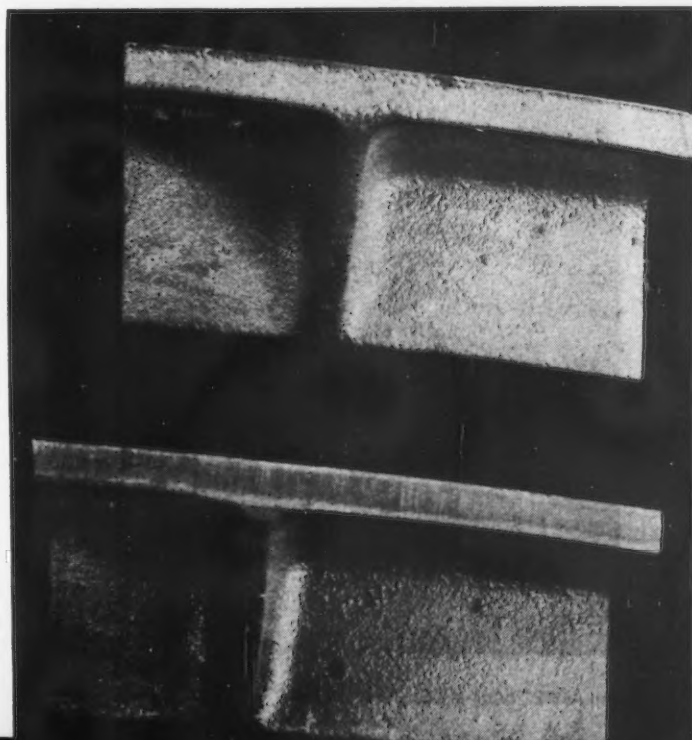
For the final pickling operation, the castings are immersed in a bath consisting of 1½ pt. of fuming nitric acid and 1½ lb. of sodium dichromate in each gallon of solution for a period of from 1 to 2 min. This is then followed by the cold water rinse which

removes the solution. To facilitate drying on the surface of the casting the final operation consists of an additional rinse in hot water. The chrome pickle bath should be preheated to 80-90 deg. F. before starting the immersion operation. Heat generated by the reaction between the nitric acid and the magnesium itself will generally be sufficient to maintain the entire bath at or slightly above this temperature.

Whereas the strength of the bath can be ascertained by chemical tests, in the absence of laboratory facilities, a reasonable degree of control over strength of the solution can be maintained by close observation of the appearance of the surface of the castings following immersion.

Although there are other types of
(CONTINUED ON PAGE 142)

TOP, showing a casting after sand blasting but before application of surface coat. No evidence of cavities can be seen. Bottom, same casting which exhibits cavities. These were disclosed by brown patches after surface coating by dichromate pickling but were not in evidence after sand blasting.



Recent Developments in Copper-

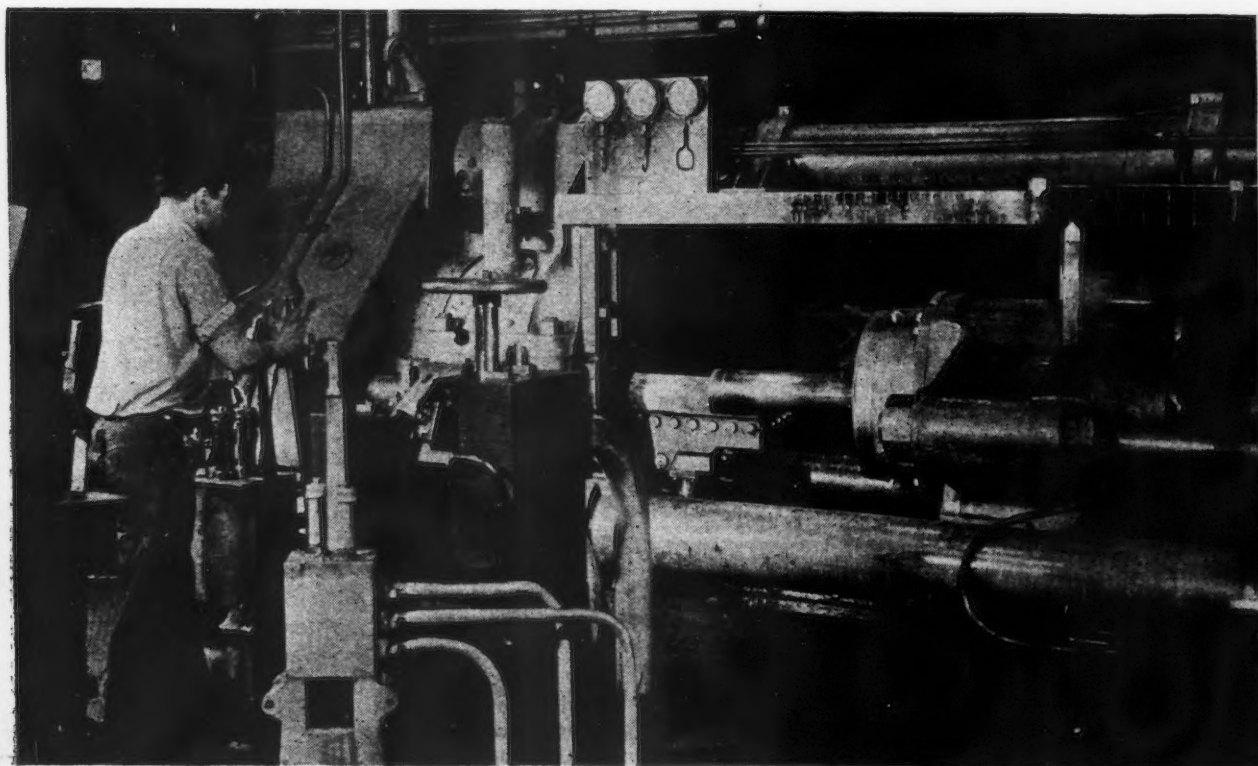
PRODUCT designers are showing an increasing tendency toward selection of the best possible metal for every part of a given job. The subject of metal specifications is assuming more and more importance because engineering requirements are higher, and because dependability of a material has become a prime factor. The fundamental truth that no chain is stronger than its weakest link is being applied to an increasing extent in every field of engineering and design. Of interest in this connection is the fact that cost is definitely becoming secondary in the thinking of those responsible for metal specifications. There is an increasing tendency to make dependability the prime factor when setting up metal specifications. The important question is whether or not the material under consideration is the best possible material for the particular job at hand. As a matter of

fact, the most suitable material from the standpoint of engineering requirements generally turns out to be the least expensive in the long run.

A fine piece of electrical apparatus goes out of commission because some tiny spring fails in service. A well-designed valve is rendered worthless because the stem corrodes or wears out prematurely. A vital outdoor electrical installation breaks down because certain connectors and bolts fail from corrosion. These are merely three examples of the types of failure which occur in countless cases where the wrong metal or alloy is used for vital parts. Why jeopardize an otherwise excellent product by using the wrong material in its construction? Engineers and designers must ask themselves many pertinent questions. What new alloys have become available? What improvements have been made in existing alloys? Are these new and improved alloys superior

from an engineering standpoint? These are questions of vital importance to engineers and product designers. Those who fail to keep abreast of modern developments in metal specifications will find themselves far behind in the procession because they may be using outmoded materials.

The enduring qualities of copper have been appreciated for many thousands of years, since ancient craftsmen hammered the red metal into ornaments, weapons and utensils which today are still in usable condition. With the passing generations, copper-base alloys have won universal recognition for their permanence, dependability, high thermal and electrical conductivity and ease of workability. They have become essential in many fields of American industry. In 1939 nearly 60 per cent of the total U. S. production of copper was absorbed by only five industries—elec-



Base Alloys . . .

By ARTHUR L. CLARK
Bridgeport Brass Co.

trical, building, automotive, power and communications.

Meanwhile, industry has moved forward, methods have been improved and the requirements are for materials capable of taking more punishment, and standing up under higher speeds. There are many new developments among the brasses and bronzes. Developments in metallurgy have paralleled technological improvement. During the past few years, research and development have endowed brasses and bronzes with special qualities which have extended their usefulness still further into fields where exceptional strength and corrosion resistance are required. With the great improvement in silicon bronzes, for example, the doors have been opened to the fabrication of strong, wear resisting parts by economical, cold forging processes. The development and improvement of the aluminum bronzes has brought forth alloys of

. . . Advances in metallurgy, melting practice and rolling have resulted in superior bronzes of the aluminum, silicon and phosphor types. Particularly where high strength, resistance to fatigue and corrosion resistance are factors, the advantages of these copper-base alloys outweigh their higher cost and make dependability in a given application the governing factor.

exceptional corrosion resistance and high strength which can be readily hot forged and machined. The phosphor bronzes have been consistently improved and endowed with greater fatigue resistance for applications in electrical, structural and other fields.

Aluminum Bronze

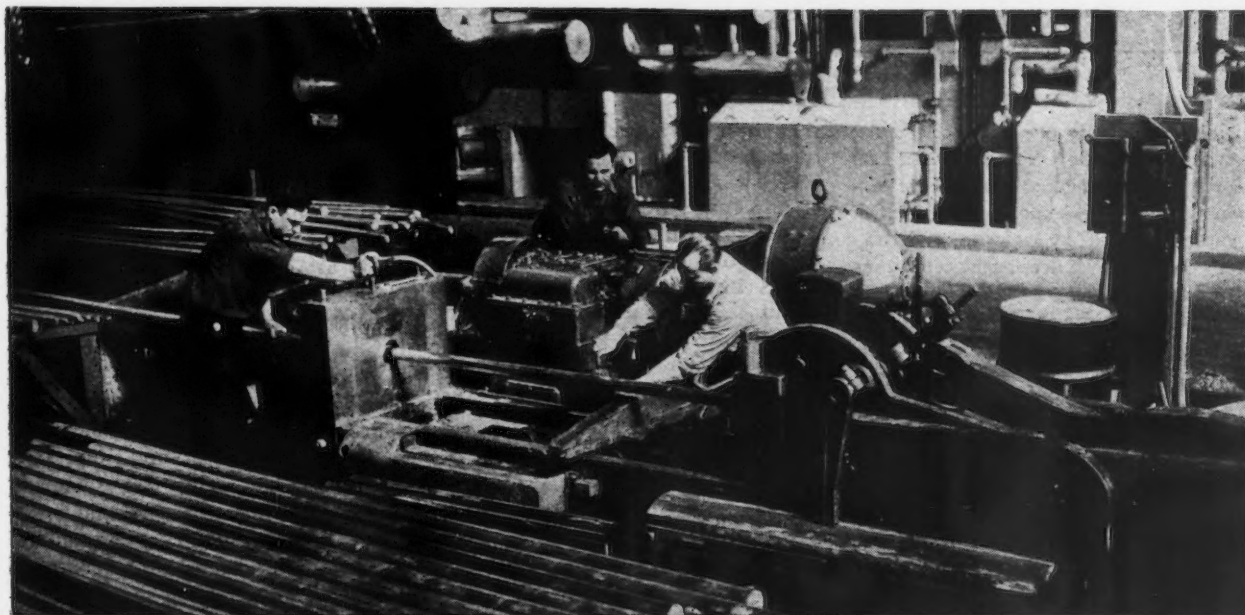
Many factors are responsible for these improvements. Intensive and consistent metallurgical research and development; modern electric melting; precisely controlled annealing furnaces; powerful rod and tube extrusion presses; more modern hot and cold rolling mills; and close coopera-

tion between laboratory, mill and the ultimate user of brass mill products.

It will pay every designer and engineer to keep abreast of the latest developments in aluminum bronzes, and to avoid being influenced by previous experiences which may have taken place many years ago. As a rule aluminum bronzes are composed of copper with aluminum up to approximately 10 per cent plus small quantities of other elements such as iron, silicon, nickel or manganese. The valuable properties of aluminum bronze have been known for more than 50 years, but owing to the limitations of melting, casting and process-

LEFT—Powerful extrusion equipment for making rod from red hot billets of brass and aluminum bronze at Bridgeport Brass Co.

BELOW—Drawing large sizes of cartridge brass rod used for making artillery cartridge cases.



ing equipment it was not practical as a brass mill product for many years. However, the picture has entirely changed. Today's modern electric furnace melting and casting, powerful extrusion presses and mill equipment plus precise knowledge of proper processing of aluminum bronze have resulted in a product with a large number of good features.

Aluminum bronzes are characterized by exceptional resistance to a

must withstand bleaching compounds as well as mechanical abrasion. These alloys have been used as valve seats and guides, spark plug inserts, tachometer couplings and magneto drive gears on aircraft engines.

A good example of how metal specifications for a single part can influence the operation of entire mills and factories is furnished by the case of gate and globe valves used on steam and water lines. Experience has shown

tact with steel and most other materials is one reason for its success in such applications involving slow moving parts. Aluminum bronzes working in combination with other metals and alloys result in less wear and longer life for both parts. Consequently, these alloys are used for gears, pinions, worms, sliding parts, rollers subject to heavy duty service.

In rod form in the annealed condition Duronze III averages more than 85,000 lb. per sq. in. tensile strength and approximately 90,000 lb. as a hot forging. It hot forges readily and machines from 50 to 75 per cent as fast as free cutting brass rod. This alloy is used for high strength screw machine items such as wire and cable connectors, bolts, nuts, oil burner nozzles, and instruments parts. It has a much higher yield strength (more resistance to creep and stretch) than brass. (See accompanying table.) This advantage is important, for example, in large, hot forged bolts used for fastening the flanged ends of pipe in submarine construction. The shock of an underwater explosion will stretch bolts of low yield strength, causing serious leaks, whereas a material of high yield strength may not be affected. It is approximately 9 per cent lighter in weight than brass and is used for the reduction of dead weight without sacrificing any strength in marine construction where corrosive conditions are severe.

Silicon Bronze

Silicon bronzes are corrosion resisting copper-silicon alloys which differ from the aluminum bronzes in that their high strength is the result of cold working. Moreover, they retain remarkable malleability even when hard drawn. For example Duronze V, an alloy of approximately 98 per cent copper and 2 per cent silicon, in the annealed condition has a tensile strength of approximately 43,000 lb. per sq. in., but this figure is raised materially by cold drawing and the alloy attains a high tensile strength without becoming brittle. Bolts made from this hard drawn wire by the cold heading, rolled thread process average from 85,000 to over 110,000 lb. per sq. in. tensile strength. Because silicon bronzes can withstand severe deformation by cold upsetting, they make possible many manufacturing economies which conserve manpower and machines, lower costs and reduce scrap. Hexagon nuts made from round wire; wire and cable clamps,

Duronze III, Silicon Aluminum Bronze, Compared to Naval Brass and Copper

MECHANICAL PROPERTIES

	Duronze III	Naval Brass	Copper
ANNEALED			
Tensile strength, p.s.i.	90,000	63,000	32,000
Yield strength at 0.5% Ext., p.s.i.	50,000	30,000	10,000
Elongation in 2 in., per cent	27	40	55
Hardness, Rockwell—B	85	60	(F) 40
Modulus of elasticity, p.s.i. x 10 ⁶	16.5	15	17
Fatigue endurance limit, p.s.i.	45,000	20,000	11,000
Impact strength, Izod, Ft.-lb.	17	16	40
		(Charpy)	
HOT FORGED			
Tensile strength, p.s.i.	90,000	60,000	35,000
Yield strength at 0.5% Ext., p.s.i.	45,000	24,000	11,000
Elongation in 2 in., per cent	30	30	45
Hardness, Rockwell—B	85	50	(F) 45
CAST			
Tensile strength, p.s.i.	65-75,000		30,000
Elongation in 2 in., per cent	10-25		40
Hardness, Rockwell—B	65-80		(F) 40

PHYSICAL CONSTANTS

	Duronze III	Naval Brass	Copper
Melting point, Liquidus, deg. F.	1814	1650	1981
Specific gravity	7.69	8.40	8.94
Weight, lb. per cu. in.	0.278	0.304	0.323
Electrical conductivity % I.A.C.S., 68 deg. F.	7.0	28.0	101.0
Electrical resistivity, ohms/mil ft./68 deg. F.	148.0	40.0	10.3
Thermal conductivity B.t.u./sq. ft./ft./hr./deg. F. at 68 deg. F.	22	68	226
Coefficient of linear expansion per deg. F.	0.000092	0.000118	0.000098

FABRICATION PROPERTIES

	Duronze III	Naval Brass	Copper
Machinability (Approx. per cent of free turning rod)	50.75	30	20
Weldability (oxy-acetylene)	Poor	Good	Poor
Hot working quality	Excellent	Excellent	Excellent
Cold working quality	Poor	Fair	Excellent
Resistance to oxidation at elevated temperatures	Excellent	Fair	Poor

*Average Values from sizes 1/2-1 in. diameter
**Grade "A"—48B6 (INT.), half hard

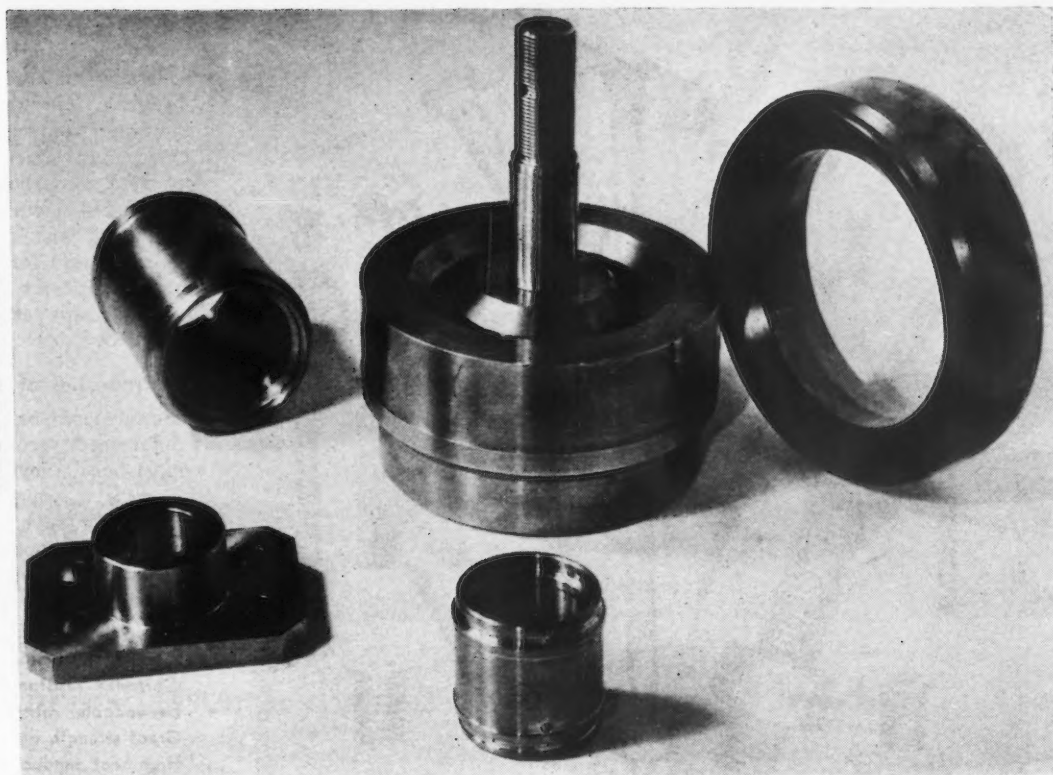
wide range of corrosive elements. Applications where corrosion is a factor include condenser and heat exchanger tubing exposed to brackish water polluted by sewage and factory wastes. Under such conditions Duronze IV, one of the aluminum bronzes containing approximately 95 per cent copper and 5 per cent aluminum, has proved superior to other condenser tube alloys. Aluminum bronzes have been used successfully for parts coming in contact with dilute acid solutions. These alloys are favored to some extent for sewage processing equipment, and for beater or Jordan bars, screen plates, and other paper mill equipment which

that the stem is the part most likely to fail, through corrosion, wear or other weakness. Here the qualities of hardness, strength, wear and corrosion resistance of aluminum bronzes are of great value. Several manufacturers have increased the life and usefulness of their valves by making the stems from this type of alloy. In one case, after switching to Duronze III, a silicon aluminum bronze (approximately 91 per cent copper, 7 per cent aluminum, 2 per cent silicon) for the manufacture of stems, it was reported that they outlasted stems made from other previously tried materials six to one. The fact that this alloy has an exceptionally low coefficient of friction when in moving con-

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PUMP and valve parts for hydraulic systems of extrusion presses, formerly made from special steels, have been replaced with Duronze III, a silicon aluminum bronze which has proved superior for these applications.



bolts, turnbuckles and screws made by cold upsetting and rolled threading are a few examples. There are many items which can be made from this alloy by coining operations or by cupping and drawing from sheet metal. Some of these are small gears, tooth wheels, shafts, pinions, guides and parts for meters, counting and timing devices, and precision instruments; in fact wherever parts are subjected to excessive wear or corrosion is a logical use for this type of alloy.

Engineers are turning their attention more and more to fundamental parts which are vital to the safety of elaborate installations and outdoor electrical equipment. In such applications, the silicon bronzes are performing particularly valuable service. For example, connectors, fittings, and fasteners made from Duronze V are about 50 per cent stronger than those made from many ordinary materials used for this purpose. Since this alloy is not subject to failure from stress corrosion cracking due to exposure to moisture, ammonia and air while under stress it ranks highly as a dependable engineering material. It is used in outdoor signal equipment, electric power stations, power and communications lines as well as for non-rusting bolts, nuts, and screws—parts of important equipment.

Water companies have used silicon bronze for making bolts used in water

meter assemblies. Such bolts can be removed and replaced countless times without "freezing" and breaking off. Thus, maintenance is reduced and time and expense saved. Other applications involving corrosion resistance are parts for automobile carburetors, and marine hardware on ocean-going vessels. Silicon bronze tubing is used for hydraulic gas and oil lines on airplanes where higher pressures require a stronger material than copper.

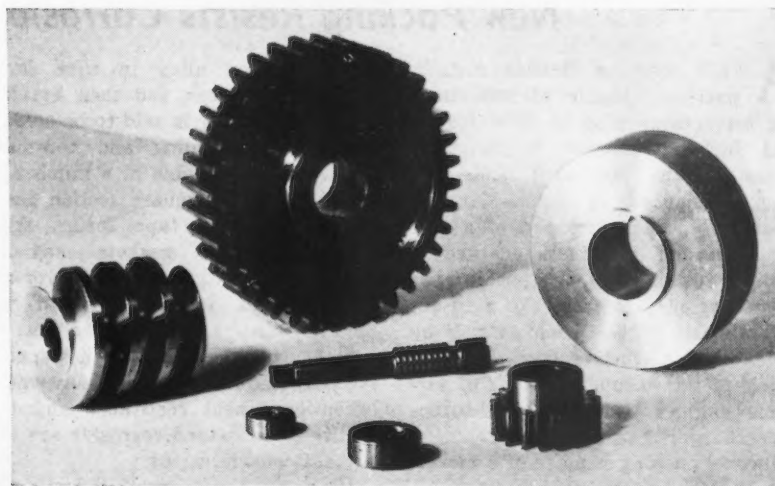
This type of material can also withstand such severe treatment as years of exposure to the elements, underground dampness, and corrosive con-

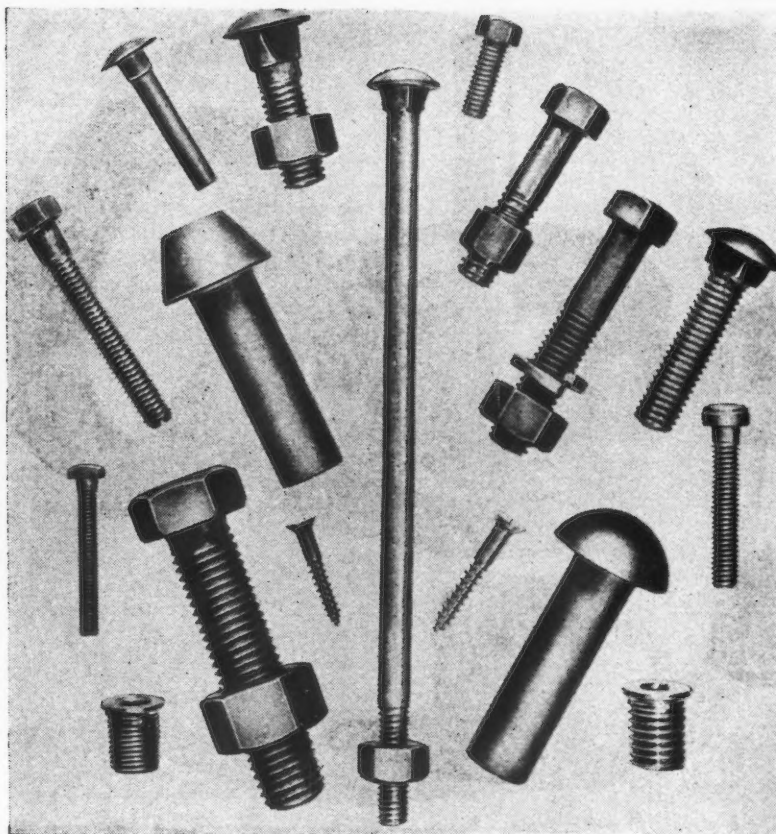
ditions encountered in sewage reclaiming plants and process industries.

Phosphor Bronze

Engineers are specifying phosphor bronze (copper-tin alloys, containing a small amount of phosphorus) more and more where exceptional resistance to fatigue and corrosion are required for a spring material. In such applications as switches, communications equipment, recording devices, etc., use of the finest possible phosphor bronze does not appreciably affect the cost of the article. But a lesser material certainly subjects an otherwise fine

ROLLERS, valve stems and gears made from Duronze III outwear steel, phosphor bronze and brass in many instances.





CORROSION resisting fastenings averaging over 100,000 lb. per sq. in. can be produced economically by cold upsetting Duronze V silicon bronze wire.

product to the possibility of early failure.

Although phosphor bronze dates back more than half a century, it nevertheless is properly considered a modern engineering alloy because it is used so extensively in modern devices such as radio, radar, control systems and similar electrical instruments. Because of improvements in melting, annealing, processing methods and equipment, plus greater metallurgical knowledge, phosphor bronzes of today are uniformly higher in quality.

When properly made phosphor bronze possesses a high endurance limit and can withstand millions of cycles of flexing without failure. This property, coupled with the fact that the alloy can be formed into complex shapes without wearing tools too rapidly, makes it ideal for many spring applications in the electrical field such as parts for switches, jack plugs, automatic controls, variable condensers, etc.

Phosphor bronze possesses other properties which make it the logical choice in many engineering applica-

tions. This alloy is characterized by high tensile and yield strengths and great toughness. It has fine resistance to corrosion from certain chemicals, sea water, and moist air, and is not subject to season cracking. These properties make phosphor bronze a good choice for clutch disks, diaphragms, metal bellows, paper mill equipment, and similar applications. It is also used for bellows in radiator valves and steam traps because of its quick thermal response and corrosion resistance.

Properties of Copper Alloys

Summarized below are some of the fundamental properties peculiar to copper-base alloys in general which are vital to every manufacturer interested in turning out a uniform product and keeping costs down. Most of these desirable qualities can be found in a single copper-base alloy.

Wide range of physical properties controlled by simple processing operations

Corrosion resistance

Dependable, satisfactory service

Great strength and hardness

High heat conductivity

Resistance to fatigue, abrasion and wear

Fine spring qualities

High electrical conductivity

Pleasing color

Non-magnetic

Good base for finishing, plating, lacquering

Ease of cold and hot working

Machinability

Ease of brazing, soldering, welding

Great advances in the fields of transportation, housing and communications are just over the horizon and will require new and better alloys to perform difficult engineering tasks. Every design engineer will do well to keep abreast of new developments in the field of copper-base alloys, for there are many applications for them in the postwar world.

New Packing Resists Corrosion and Heat

A NEW type of flexible metallic packing capable of withstanding temperatures up to 2000 deg. F. and highly resistant to corrosive gases, alkalies and most acids, has been announced by Johns-Manville. Made of Inconel wire and of a construction and toughness adapted to many industrial uses, this packing has been developed to meet the need for a material which would stand up under the destructive conditions existing in the exhaust systems of airplane engines equipped with turbo-superchargers.

Inconel packing is made of a nickel-

chromium-iron alloy in wire form, knitted into mesh and then braided. The new packing is said to be strong, resilient, non-scaling and non-magnetic. It is available in a number of styles, including square section packing in coil and tape forms, from which ring-type gaskets may be formed. One style is made with asbestos fibers interwoven with the metallic alloy as a sealing agent.

It is expected that this new packing may find many applications where exceptional heat resistance and the ability to withstand corrosion are important considerations.



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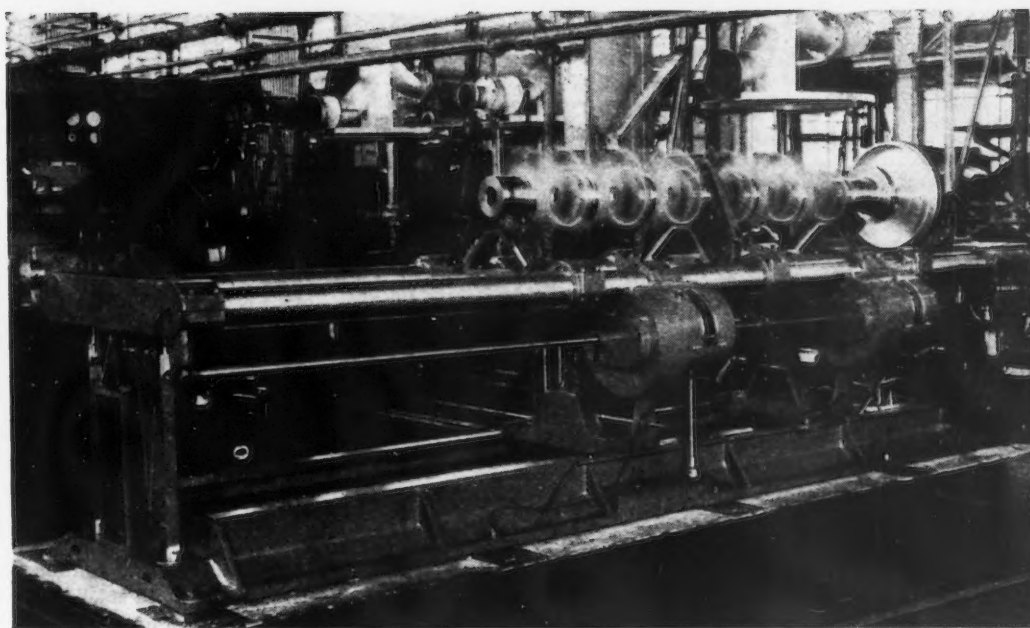
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NEW Tinius Olsen dynamic balancing machine, recently installed in the Grove City, Pa., plant of Cooper-Bessemer Corp. to insure greater precision in the manufacture of its diesel crankshafts. Note the dual compensators immediately below the crankshaft being balanced.



Cooper-Bessemer Installs Large Balancing Machine

A LARGE sized dynamic balancing machine equipped with dual compensators so that corrections may be indicated both as to exact angle and amount in any two predetermined correction planes, has been installed by the Cooper-Bessemer Corp. in its Grove City, Pa., plant to bring about still greater precision in the manufacture of its diesel crankshafts. The machine is capable of handling the company's JS-8 shafts which have bearings up to a 9 in. diameter and which weigh as much as 5800 lb. and are up to 15 ft., 7½ in. in length.

According to the Tinius Olsen Testing Machine Co., Philadelphia, which

manufactured the machine to Cooper-Bessemer requirements, the use of the dual compensators is a new feature which does away with any calibration by giving a direct reading of the amount of unbalance at the two points of correction. The compensators remain set after the readings are taken, and after the machine is stopped reveals to the operator exactly where and how much correction is to be applied to obtain balance.

Another feature of the balancer is the application of a center support roller with holddown bracket to keep the long crankshafts or other long rotating part in alignment during the

balancing operation. This eliminates the possibility of whipping at high speed and does not affect unbalance readings in either end of the shaft. Most machines of this kind are so constructed as to make this third support impossible, according to the manufacturer.

Cooper-Bessemer has made extensive tests with the new balancing machine both on its forged and cast crankshafts and its engineers predict that combined with recent improvements in bearing design, greater precision than ever before will now be possible in the manufacture of engines ranging from 135 to 1200 hp.

Tool steel tubing, a material used to eliminate the boring operation in the manufacture of tubular or ring-shaped tool steel parts, has proved successful in the making of large expanding arbors, one of which is illustrated. The parts made of tool steel tubing are the slotted sleeve, center, and the three rings, one straight and two tapered, shown on the shaft and beside it. The arbor sleeve is 13⅞ in. long, 6⅞ in. o.d., and 4 in. i.d. with six slots, three milled at each end. In milling, a narrow tie bar was left at the edge of the sleeve until after heat treating, to prevent distortion, and was then cut through with a rubber bonded abrasive wheel. This tool was previously made of a solid bar of carbon steel, bored out, machined and carburized. This method was expensive and the material warped in hardening. The tool steel tubing was supplied by the Bissett Steel Co., Cleveland.



Improving the Weldability of High

SINCE the examination of the six commercial steels revealed that aluminum content might be an important factor with respect to weld-crack sensitivity, and as the study pertaining to structures showed that coarse carbide steels were insensitive, because the carbides were less readily soluble, it appeared advisable to investigate these two factors further.

To carry out this part of the project, a 300 lb. heat of SAE 4130 steel was made in an induction furnace and split into three parts. The first ingot was poured without an aluminum addition to the steel, but the silicon content was purposely kept on the high side to insure a killed steel. The remainder of the steel in the furnace was deoxidized with an addition of 1½ lb. of aluminum per ton after which the second ingot was poured. Sufficient ferrotitanium was then added to the furnace to yield a titanium content of 0.25 per cent in the finished steel. The purpose of this large titanium addition was to form titanium carbides, which are extremely stable at high temperatures and therefore should decrease the crack sensitivity, provided that carbide solubility is a factor. The chemical analyses of these three steels are shown in Table VIII.

These steels which are identified as

By S. L. HOYT, C. E. SIMS
and
H. M. BANTA
Battelle Memorial Institute

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heat Nos. 9626-1, 2 and 3 were then processed as follows:

- (1) Ingots forged and hot rolled to ¼ in. strips.
- (2) Annealed at 1300 deg. F. for 12 hr.
- (3) Cold rolled to 0.125 in. gage.
- (4) Annealed at 1300 deg. F. for 12 hr.
- (5) Normalized in a salt bath at 1640 deg. F. for 1 hr.

Photographs of the structures prior to normalizing are shown in Figs. 14 and 15. As would be expected from the thermal treatment, these steels were in a spheroidized condition at this state of processing. It will be noted that the carbides in the aluminum-killed steel are appreciably larger than those in the aluminum-free steel, the smallest carbides being found in the aluminum-titanium steel. These results demonstrate that aluminum promotes carbide coalescence and that the addition of titanium produces additional points at which nucleation can occur.

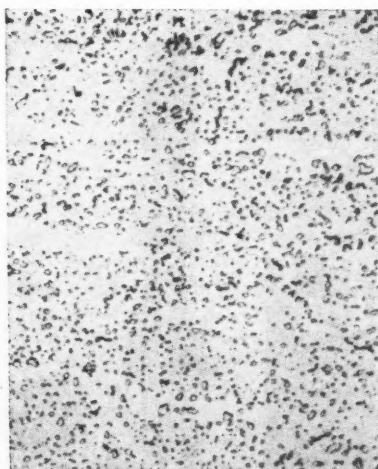
From the normalized and drawn structures, the condition in which the steels were tested, Figs. 16 and 17, is seen that the aluminum-free steel has

an extremely large grain size, but that the carbides are more uniformly distributed and the ferritic areas are smaller than in the other two steels. Some difference can be seen in the structure of the aluminum and aluminum-titanium steels, the latter having coarser carbide particles in the pearlite.

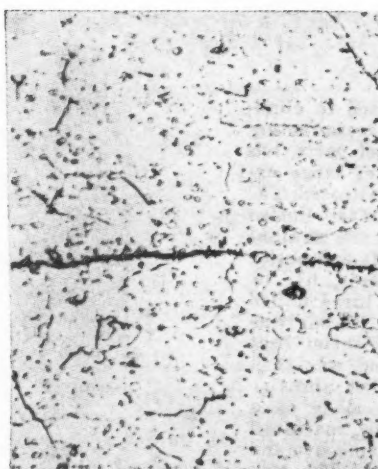
Rapid Dilatometer Tests

The dilatometer characteristics of these steels were determined using the rapid heating and cooling cycle previously discussed. Data pertaining to these tests are shown in Table IX. Since the cooling curves are the pertinent data obtained from these tests, they are shown in Fig. 18. It is obvious from these curves that temperature-dilation characteristics of these steels vary widely.

The steel made without aluminum No. 9626-1, has a much lower A_{r_1} temperature than the aluminum and aluminum titanium-treated steels. These results indicate that a higher carbon austenite was developed during the rapid heating of the aluminum-free steel than in the two treated steels. Since the chemical analyses of these steels are almost identical, the low A_{r_1} temperature of the aluminum-free steel signifies that the carbides of this steel are more readily soluble.



Steel 9626-1—No aluminum



Steel 9626-2—Aluminum treated

FIG. 14—Annealed structures prior to normalizing. Note that the carbides are larger in the aluminum-treated steel, although both steels were processed in the same manner. Nital etch, 1000X.

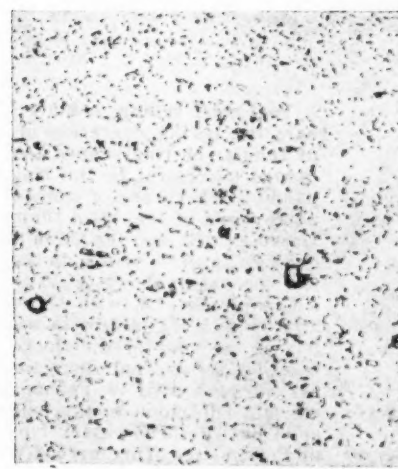


FIG. 15—Annealed structure, before normalizing, of steel No. 9626-3 treated with aluminum and titanium. Note that the carbides are relatively small in this structure. Nital etch, 1000X.

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The cooling curve of the aluminum-killed steel shows that transformation starts at a relatively high temperature, 1240 deg. F., approximately 140 deg. F. higher than the similar point in the case of the aluminum-free steel. Obviously, this reveals that the carbides in the aluminum-killed steel are less soluble as compared with the aluminum-free material. It will be noted that the cooling curve of the aluminum treated steel is relatively straight, approaching the type of curve obtained with spheroidized stock (see Fig. 18).

The titanium treated steel showed a typical split transformation during cooling. The first and principal transformation started at about 1300 deg. F. and was substantially complete at 1200 deg. F., while the lower transformation took place in the range of 975 deg. F. to 750 deg. F., the magnitude of the latter being quite small. This curve indicates that most of the austenite formed during the short heating cycle was of relatively low-carbon content as revealed by the high temperature at which the first transformation occurred, small areas of a higher carbon concentration producing the lower transformation. As would be expected, these results indicate that the carbides in the titanium treated steel are the least soluble.

In the case of the aluminum free vs. aluminum killed steels, it is obvious from the above dilatometer data that the normalizing treatment, although carried out at 1640 deg. F. for 1 hr., did not obliterate the effect of the carbide size which was established during annealing. While the carbide size in the annealed titanium steel was smaller than in either of the other steels, the difference in-size was more than compensated for by the presence of titanium carbide, which is much more stable than iron and chromium carbide at elevated temperatures.

Crack-Sensitivity Tests

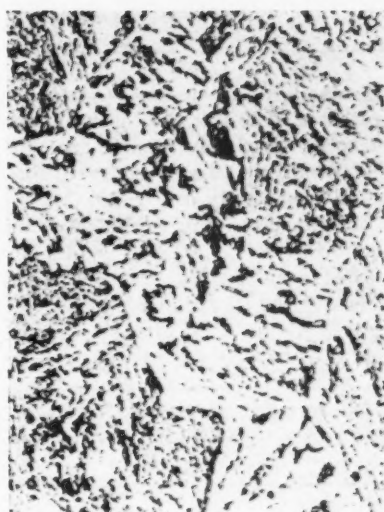
Circular bead crack-sensitivity tests were made using the procedure as previously described. The results of these tests are summarized in Table X. From the work to date, it appears that steels with a sensitivity index of 0.90 to 1.00 may be classified as borderline

... In the second part of the article, begun last week, the authors report on the effect of aluminum and titanium upon the crack sensitivity of SAE 4130 steel. An investigation was also made on the effect of titanium and carbide size on the crack sensitivity properties of NE 8635 steel. This is part of an investigation instigated by the Office of Production Research and Development of the WPB.

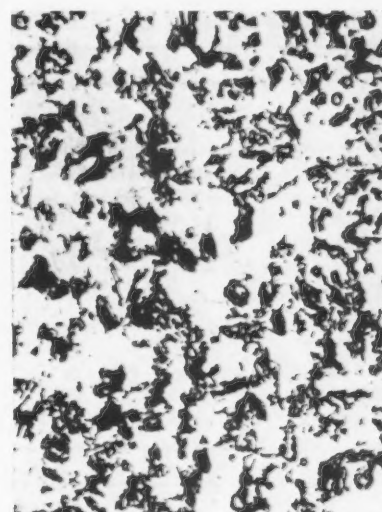
steels, with those below 0.90 being crack sensitive and those above 1.00 being relatively insensitive. With these values as a guide, it is obvious that the addition of aluminum resulted in a marked decrease in crack sensi-

tivity, the sensitivity being further reduced by the addition of titanium.

Rounds for Jominy end-quench hardenability tests were forged from each of the three ingots, followed by normalizing at 1650 deg. F. for 1 hr.



Steel 9626-1—No aluminum



Steel 9626-2—Aluminum treated

FIG. 16—In these normalized structures, the grain size of the aluminum-free steel is extremely large, but the carbides are more uniformly distributed and the ferritic areas are smaller than in the aluminum-killed steel. Nital etch, 1000X.

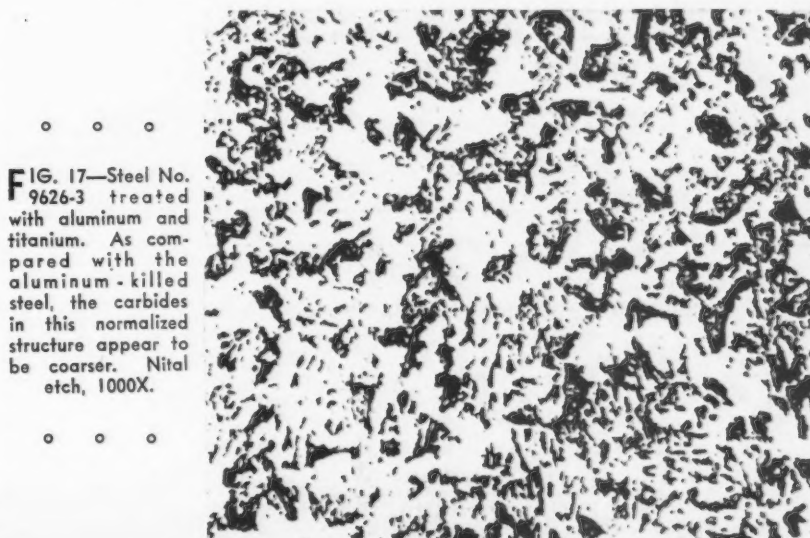


FIG. 17—Steel No. 9626-3 treated with aluminum and titanium. As compared with the aluminum-killed steel, the carbides in this normalized structure appear to be coarser. Nital etch, 1000X.

TABLE VIII
Chemical Analysis of SAE 4130 Experimental Steels

Heat No.	C	Mn	P	S	Si	Ni	Cr	Mo	Ti	Al*
9626-1	0.36	0.52	0.011	0.029	0.40	0.03	1.00	0.18	....	0.00
9626-2	0.36	0.53	0.012	0.029	0.40	....	0.99	0.19	....	0.06
9626-3	0.37	0.55	0.010	0.029	0.44	....	1.00	0.18	0.25	0.09

* Aluminum values are the acid-soluble contents.
The high-aluminum content of the third ingot is due to the aluminum content of the ferrotitanium addition.

TABLE IX
Dilatometer Data for Experimental SAE 4130 Steels
Using Rapid Heating and Cooling Cycle

Heat No.	Average Heating Rate Between 80-1800 Deg. F. in Deg. Per Min.	Average Cooling Rate Between 1800-700 Deg. F. in Deg. Per Min.	Transformation Temperatures, Deg. F.			
			Ac ₁	Ac ₃	Ar ₃	Ar ₁
9626-1	570	300	1360	1440	970	840
9626-2	546	306	1370	1490	•	•
9626-3	573	347	1370	1490	†	†

* Cooling curve not sufficiently sharp to locate Ar₃ and Ar₁ points. See Figure 28.
† Split transformation.

TABLE X
Summary of Crack-Sensitivity Data
on Split Heat of SAE 4130 Steel

Heat Number	Deoxidation	Average Total Length of Cracks in Per Cent	Crack Sensitivity Index* of Steel Index No. "A"
9626-1	No alum.	57.2	0.94
9626-2	Aluminum	14.8	1.15
9626-3	Al and Ti	11.0	1.18
557*	.....	43.9	1.00

* Steel 557 used as control.

The standard test specimens were then heated to 1650 deg. F. for 1 hr. and quenched in a conventional type jig. The results of these tests are illustrated graphically in Fig. 19.

The hardenability curves for the aluminum-free and the aluminum-treated steels are practically identical, whereas the titanium addition decreases the hardenability an appreciable extent. These data clearly illustrate that Jominy hardenability values are not necessarily related to the crack-sensitivity. It is quite prob-

TABLE XI
Tensile Properties of Experimental SAE 4130 Steels

Steel Number	Thermal Treatment	Yield Strength, Lb./Sq. In.	Tensile Strength, Lb./Sq. In.	Per Cent Elongation, 2 in.	Remarks
9626-1	Normalized & drawn	98,330	128,000	13.5	No aluminum
9626-1	Normalized & drawn	98,330	128,760	12.5	
9626-2	Normalized & drawn	97,860	129,930	13.5	1½ lb. Al per ton
9626-2	Normalized & drawn	97,040	128,620	13.5	
9626-3	Normalized & drawn	84,030	124,130	17.5	1½ lb. Al and Ti
9626-3	Normalized & drawn	.....	.....	.....

Note: Yield strength determined from stress-strain curve using load at 0.2 per cent offset.

TABLE XII
Chemical Analysis of Heat 10093 Containing Increasing Amounts of Aluminum

Heat No.	C	Mn	P	S	Si	Cr	Mo	Ni	Al*
10093-1	.35/.35	.56	.010	.027	.24	.87	.26	.03	.02
10093-2	.34/.34	.56	.011	.027	.25	.89	.27	...	.05
10093-3	.35/.34	.56	.011	.026	.25	.89	.25	...	.09
10093-4	.34/.34	.57	.011	.026	.25	.89	.22	...	.12
10093-5	.33/.33	.57	.011	.026	.25	.90	.20	...	.16
10093-6	.31/.31	.56	.011	.026	.24	.89	.20	...	.19

* The aluminum values are the acid-soluble.

able that if end-quenched specimens could be treated to the quenching temperature in a period of 2 or 3 min., there would be a correlation between the crack-sensitivity and the hardenability, provided the microstructure of the end-quench specimen and the steel used for the crack-sensitivity tests were similar and had been arrived at by similar processing. However, it appears that the rapid dilatometer test is more simple and accurate than such a hardenability test.

From Table XI in which the tensile properties are listed, it is seen that the properties of the aluminum-free and the aluminum-treated steel are practically identical. In the third steel, the addition of titanium decreased the ultimate and the yield strength, the effect being much more pronounced on the latter. Accompanying the decrease in tensile strength, there was the usual increase in elongation.

Effect of Aluminum Additions

Since it has been demonstrated that the crack sensitivity of SAE 4130 steel can be decreased to an appreciable extent by deoxidation with 1½ lb. of aluminum per ton, it appeared advisable to investigate the effect of even larger aluminum additions. A 300 lb. induction furnace heat of SAE 4130 steel was made and split into six ingots. These ingots were deoxidized with aluminum additions ranging from 1 to 6 lb. per ton while the metal was still in the furnace.

The chemical analyses, including the acid-soluble aluminum content of these six steels, are shown in Table XIII. The carbon content was purposely made on the high side of the specification to insure a crack sensitive steel. It will be noted that there was some loss in carbon during the pouring of the heat which is especially noticeable in the last ingot. As would be expected, the aluminum recovery is appreciably higher than would be obtained in basic open hearth practice.

The ingots were forged, followed by hot rolling to 0.250 in. gage, after which the stock from each ingot was divided into two lots and processing was completed as follows:

Lot No. 1

- Hot rolled to 0.170 in. gage.
- Annealed for 8 hr. at 1250 deg. F.
- Cold reduced to 0.125 in. gage.
- Normalized at 1650 deg. F. for ½ hr.

- (e) Drawn at 900 deg. F. for 1 hr.
 Lot No. 2
 (a) Normalized at 1650 deg. F. for 1 hr.
 (b) Drawn at 900 deg. F. for 1 hr.

Properties of Lot No. 1

From the chemical analyses and the tensile properties which are listed in Tables XII and XIII, it appears that steels Nos. 10093-1 to 4 are practically identical with the exception of aluminum content. However, the last two ingots are somewhat lower in carbon, which is reflected in the tensile properties. Since carbon content exerts such a pronounced effect upon crack sensitivity, it was found that the steel from the last ingot, 10093-6, was not comparable with the remainder of the heat. Fortunately, the data from both 10093-5 and 6 may be omitted without detracting from the value of this phase of the investigation.

The effect of aluminum content upon crack sensitivity is shown graphically in Fig. 20, which is constructed from the sensitivity data listed in Table XIV. It will be noted there is a marked decrease in sensitivity as the aluminum content (acid-soluble) is increased from 0.02 to 0.05 per cent. With further increases in aluminum, the effectiveness decreases to the point where there is little to be gained by additions which yield more than 0.09 per cent acid-soluble aluminum.

These data clearly indicate the marked decrease in sensitivity that may be obtained (without sacrifice in tensile properties) by increasing the aluminum content from the conventional value of 0.02 or 0.03 per cent to 0.09 per cent. It is significant that the improvement accompanying the higher aluminum steels can be obtained only when the steel is subjected to an annealing treatment at some stage during processing, the reason for which will be discussed later.

While none of the aluminum contents was detrimental to the physical properties of the steel, it was observed while making the sensitivity tests that the beads deposited on steels with aluminum content of 0.12 per cent or more were porous, the porosity increasing with the aluminum content. This characteristic necessarily limits the aluminum that may be used but does not appear too serious since a marked improvement is obtained at a value which is somewhat less than that which produces porosity.

Properties of Lot No. 2

The six steels in Lot No. 2 were processed by hot rolling to $\frac{1}{4}$ in. gage followed by normalizing at 1650 deg.

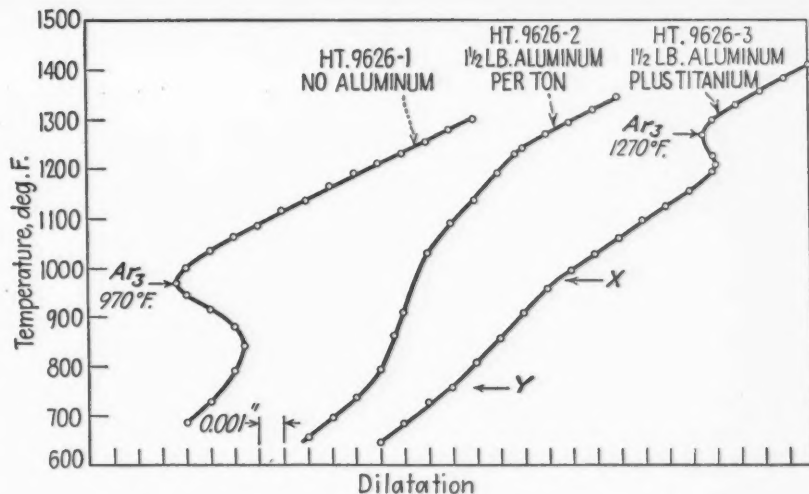
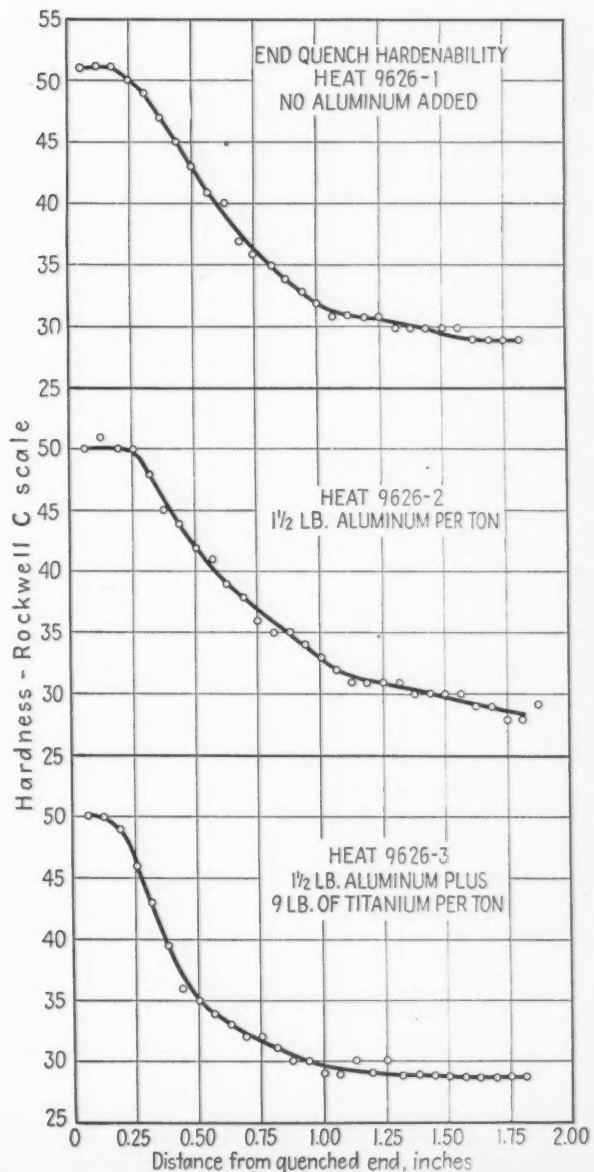


FIG. 18—Dilatometer cooling curves showing the effect of aluminum and titanium additions.

FIG. 19—These Jominy curves show that steels Nos. 9626-1 and 2 have practically identical hardenability, although they differ widely in their cracking characteristics.



F. for an hour and drawing at 900 deg. F. The tensile properties of steels Nos. 10093-1 to 4, inclusive, show a high degree of uniformity, while the values for 10093-5 and 6 are lower owing to the lower carbon content (see Table XV).

The results of the crack-sensitivity tests are recorded in Table XVI. From these data, it is obvious that the sensitivity of these

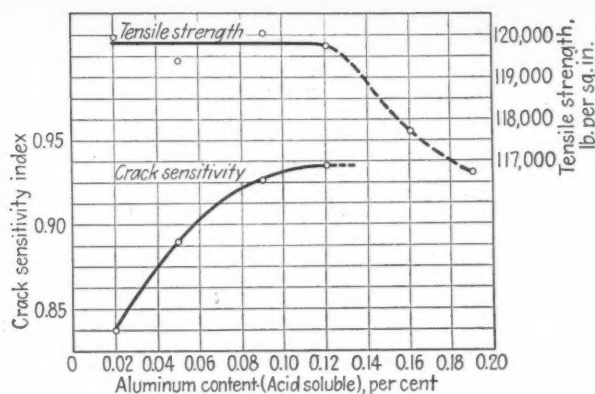


FIG. 20—Crack sensitivity and tensile strength with respect to the aluminum content of the annealed-normalized steels. The decrease in tensile strength of the two high-aluminum steels was due to a lower carbon content; therefore, these two steels are not comparable with the remainder of the group.

steels was not affected by aluminum additions, steels Nos. 10093-1 to 3, having practically identical sensitivity values. The sensitivity of steel No. 10093-4 was held not to be in agreement with the results obtained from the first three ingots. It will also be noted that the sensitivity values for steels Nos. 10093-5 and 6 are low owing to the lower carbon content as explained previously.

The principal difference in the processing of these two lots was that Lot 1 received an annealing treatment while Lot 2 did not, although both steels were normalized and drawn as the final treatment. The test results indicate that it is the indirect effect of aluminum that decreases the sensitivity as a result of the accelerating effects of additional aluminum upon the rate of carbide coalescence during annealing. Previous work in this investigation has demonstrated that the sensitivity is reduced by increasing the carbide size prior to normalizing. Therefore, the explanation concerning

aluminum appears satisfactory since it accounts for the beneficial results obtained when the steels were annealed and normalized. It is also in agreement with the fact that no improvement was obtained from increased aluminum content in the hot rolled and normalized steels. In the latter case, there was no opportunity for carbide growth so the aluminum had no effect upon crack sensitivity.

Fig. 21 shows a comparison of the sensitivity of Lot 1 with Lot 2. This graph reveals the advantage of a combination of high aluminum additions and an annealing treatment prior to normalizing.

As indicated in Table XIII, marked decrease in sensitivity may be obtained without any perceptible sacrifice in tensile properties, but if the annealing treatment is too drastic and results in abnormally large carbides, subsequent normalizing will not produce tensile properties sufficiently high to meet specifications. Such

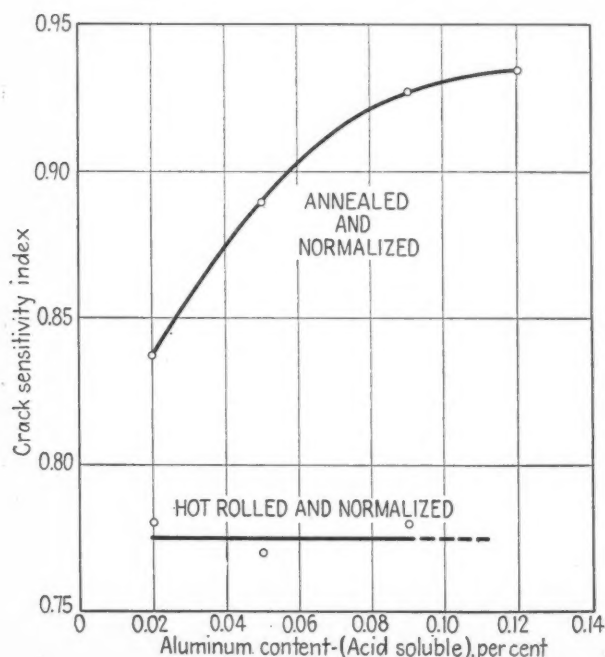


FIG. 21—Crack sensitivity decreases with aluminum content only when the steel is annealed prior to normalizing

TABLE XIII
Tensile Properties of Heat 10093—Lot No. 1

Heat Number	Yield Strength, Lb./Sq. In.	Tensile Strength, Lb./Sq. In.	Per Cent Elongation, 2 in.
10093-1	92,190	119,380	18.0
10093-1	92,940	120,850	18.5
10093-2	94,300	120,180	18.0
10093-2	90,920	118,620	13.0*
10093-3	91,870	119,430	18.0
10093-3	93,580	120,620	18.0
10093-4	92,560	120,000	18.0
10093-4	91,860	119,510	18.5
10093-5	89,080	117,720	13.5*
10093-5	89,080	117,720	14.5
10093-6	89,500	117,280	15.0
10093-6	88,680	116,280	16.0

* Specimen broke short.

Note: The above steels were hot rolled, annealed, cold rolled, normalized and drawn.

Yield strength determined from stress-strain curve using load at 0.2 per cent offset.

steels are always extremely insensitive.

Effect of Titanium

In order to study further the effect of titanium and carbide size upon crack sensitivity and the mechanical properties, an induction furnace heat of NE 8635 steel was split and half of the steel was treated with sufficient ferrotitanium to finish with a titanium content of 0.15 per cent. The entire heat was deoxidized with 2 lb. of aluminum per ton. The chemical compositions of these two ingots are shown in Table XVII.

The two ingots were forged to billets and hot rolled to strip approximately 4½ in. wide by ¼ in. thick. The strip was then annealed and cold rolled to ¼ in. gage. The purpose of the cold reduction was to accelerate carbide growth during the subsequent spheroidizing treatment. The cold-

TABLE XIV
Summary of Crack-Sensitivity Data on Heat 10093—Lot No. 1

Heat Number	Aluminum Addition Lb./Ton	Average Total Length of Cracks in Per Cent	Crack Sensitivity Index of Steel Index No. "A"
10093-1	1	73.9	0.84
10093-2	2	82.8	0.89
10093-3	3	84.0	0.93
10093-4	4	82.4	0.93
10093-5*	5	82.3	0.94
10093-6*	6	18.1	1.10

* Steels 10093-5 and 6 are not comparable with the remainder of the group owing to lower carbon content.

The above steels were hot rolled annealed, cold rolled, normalized and drawn.

TABLE XV

Tensile Properties of Heat 10093—
Lot No. 2

Heat Number	Yield Strength, Lb./Sq. In.	Tensile Strength, Lb./Sq. In.	Per Cent Elongation, 2 In.
10093-1	90,410	119,680	17.0
10093-1	91,510	120,480	16.5
10093-2	92,540	119,000	16.5
10093-2	93,040	120,000	17.5
10093-3	90,730	119,040	15.5
10093-3	92,220	119,840	16.0
10093-4	91,340	119,600	16.5
10093-4	92,220	120,040	16.5
10093-5	88,040	118,040	16.5
10093-5	88,460	118,820	17.0
10093-6	88,450	114,850	16.0
10093-6	85,470	115,810	17.5

Note: The above steels were hot rolled, normalized, and drawn.

reduced stock from each ingot was divided into four groups and treated in the manner outlined below to produce a wide range of carbide sizes:

- Group 1: Oil quenched from 1625 deg. F. and spheroidized for 18 hr. at 1300 deg. F.
- Group 2: Spheroidized for 2 hr. at 1300 deg. F.
- Group 3: Spheroidized for 40 hr. at 1300 deg. F.
- Group 4: Spheroidized for 224 hr. at 1300 deg. F.

Microexamination of specimens from each of the four groups showed that the carbide size ranged from quite small in Group 1 to abnormally large carbides in Group 4.

Rapid Dilatometer Tests

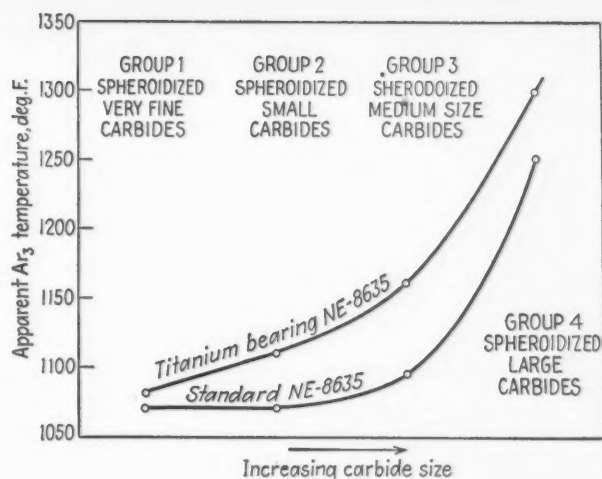
Following the above treatments, the temperature-dilatation characteristics of the standard and titanium-bearing steels were determined using the rapid heating and cooling cycle previously described. The pertinent dilatometer data are summarized in Fig. 22, showing that the apparent A_{r3} temperature increases with the carbide size. It will also be noted that the A_{r3} temperatures of the four titanium steels are appreciably higher, as compared with the corresponding standard steels. This difference indicates

TABLE XVI

Summary of Crack-Sensitivity Data
on Heat 10093—Lot No. 2

Heat Number	Aluminum Addition Lb./Ton	Average Total Length of Cracks in Per Cent	Crack Sensitivity Index of Steel Index No. "A"
10093-1	1	55.5	0.78
10093-2	2	57.9	0.77
10093-3	3	55.3	0.78
10093-4	4	39.2	0.85
10093-5	5	33.3	0.88
10093-6	6	17.5	0.96

FIG. 22—Effect of carbide size and titanium upon the apparent A_{r3} temperature of spheroidized steels. It will be noted that both increased carbide size and titanium raise the apparent A_{r3} temperature.



that the carbides in the titanium steel are less readily soluble.

Obviously, the tensile properties of the spheroidized NE 8635 steels are much below that required for practical applications. To increase the strength, specimens from each of the two steels and four groups were normalized by heating to 1625 deg. F. for 30 min. in a salt bath, followed by air cooling and a 900 deg. draw.

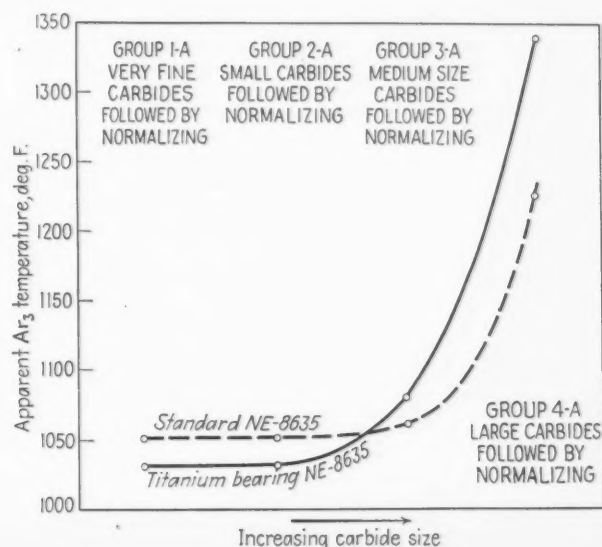
After the normalizing treatment, the temperature-dilatation characteristics were again determined. The data from these tests are summarized in Fig. 23. As would be expected, the normalizing treatment lowered the apparent A_{r3} temperature of the standard steels by 20 to 35 deg. F. as compared with the spheroidized material (See Table XVIII.) However, in the case of the titanium-bearing steels, the A_{r3} temperature of the fine carbide steels in Groups 1-A and 2-A was reduced 50 and 80 deg. F., respectively. But in the case of the coarse carbide steels in Groups 3-A and 4-A, the nor-

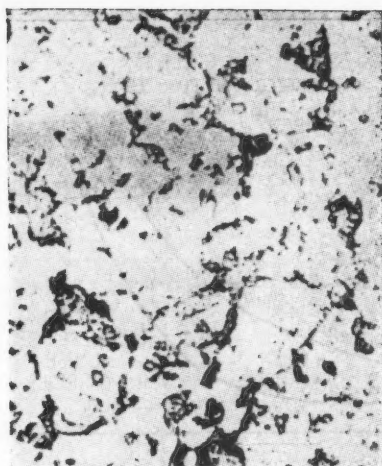
malizing actually increased the A_{r3} temperature, a result which was totally unexpected.

It is possible that the apparent inconsistency of the effect of titanium may be because of the dual influence of titanium upon steel. A comparison of the standard with the titanium-bearing NE 8635 steel indicates that the addition of titanium modifies the steel in a twofold manner: First, the titanium may produce finer carbide particles; and second, titanium stabilizes the carbides, making them less soluble in austenite at elevated temperatures. Since these effects of titanium may exert opposite influences, the overall results are affected by other factors as will be demonstrated.

When the fine carbide steels from Groups 1 and 2 were normalized, the titanium steels developed a much finer structure. As a result of the finer structure, the A_{r3} temperatures of the titanium steels in Groups 1-A and 2-A are lower than the standard steels. In this case, the dominating effect of the

FIG. 23—The effect of prior structure and titanium upon the apparent A_{r3} temperature of normalized steel. Note that if the carbides are small prior to normalizing, the A_{r3} temperature of the normalized titanium-bearing steel is lower than that of the standard steel. This situation is reversed in the case of larger carbides.





Standard NE 8635 steel



Titanium-bearing NE 8635 steel

FIG. 24—These structures were obtained by normalizing the coarse carbide steels from Group 4 (See Fig. 22) which were cold reduced and spheroidized for 224 hr. at 1300 deg. F. Nital etch, 1000X.

titanium was the result of the increase in the number of points at which nucleation could occur.

When the titanium steels from Groups 3 and 4 were heated to 1625 deg. F. during normalizing, it appears that a portion of the most soluble constituent of the complex carbides (presumably iron carbide) went into solution. When the steel was cooled, the dissolved carbide was precipitated as small, widely separated patches of fine pearlite. From Fig. 24, it will be seen that only a small portion of the total carbides was dissolved, as the amount of pearlite is quite limited,

and there are numerous large spheroidal carbides remaining in the structure. Obviously, these remaining spheroidal carbides should be less soluble than those present prior to normalizing, since a portion of the more soluble constituent has been removed. Therefore, when the normalized titanium steels, 3-A and 4-A, were rapidly heated and cooled during the dilatometer test, there was not sufficient time for the carbon of the scattered pearlite areas to diffuse through the large ferrite areas before the start of the cooling cycle. Since the spheroidal carbides had been ren-

dered less soluble by the normalizing treatment, the dilatometer results were predominantly the characteristics of the large ferritic areas. Therefore, the A_{r3} temperatures of the titanium steels in Groups 3-A and 4-A were higher than those of the standard steel which contained appreciably more pearlite. Hence, in these coarse carbide steels, it appears that the effect on solubility of the carbides is the principal influence of the titanium.

From the summary of the dilatometer data, as shown in Table XVIII, it appears that normalizing will decrease the crack sensitivity of the titanium steel, provided the prior carbide structure is not too fine. However, in the case of the standard NE 8635 steel, normalizing will increase the crack sensitivity regardless of carbide size.

The effect of structure, prior to normalizing, upon the physical properties after normalizing was also investigated. In general, the yield strength of the standard steel decreases as the carbide size, prior to normalizing, increases. The titanium content has little effect upon the tensile properties of the small carbide steels and lowered only slightly the yield strength of the 40 hr. spheroidized-normalized material. However, in the very coarse carbide steel from Group 4-A, which was spheroidized for 224 hr., the titanium content lowered the yield strength approximately 35,000 lb. per sq. in. and the tensile strength 25,000 lb. With the exception of the titanium-bearing 4-A, all of these steels exceeded the minimum requirements of 75,000 lb. ultimate with 7.0 per cent elongation.

Circular bead-crack sensitivity tests were made on the annealed-normalized material from both the standard and the titanium-bearing steels. All of these steels were found to be extremely insensitive, the total length of the cracks ranging from 0 to 36 deg., the average being 14 deg. All of the index values were between 1.25 and 1.30 with the exception of the coarse carbide titanium steel from Group 4, which had an index of 1.34, and the standard steel from Group 2 with an index of 1.17.

With such a limited degree of cracking, it has been found that the test is not sufficiently discriminating to distinguish the differences which are indicated by the rapid dilatometer test. It should be noted that these tests were made prior to the development of the hinged water-cooled jig.

(To be concluded next week)

TABLE XVII

Chemical Analysis of The Standard and Titanium-Bearing NE 8635 Steels

Heat No.	C	Mn	P	S	Si	Cr	Ni	Ti
9282-1	0.35	0.74	0.014	0.035	0.25	0.47	0.60	0.01
9282-2	0.35	0.85	0.013	0.035	0.25	0.51	0.60	0.15

TABLE XVIII

Comparison of A_{r3} Temperatures of The Spheroidized With The Spheroidized-Normalized NE 8635 Steels

Steel No.	Group No.	A_{r3} Temp. Deg. °F. of Spheroidized Steel	A_{r3} Temp. °F. of Spheroidized-Normalized Steel	Change in A_{r3} Temp. °F. Due to Normalizing
9282-1	1	1070	1050	-20
9282-2	1	1080	1030	-50
9282-1	2	1070	1050	-20
9282-2	2	1110	1030	-80
9282-1	3	1095	1060	-35
9282-2	3	1160	1180	+20
9282-1	4	1250	1225	-25
9282-2	4	1300	1340	+40

Note: Steel 9282-1 is the standard NE 8635 composition. Steel 9282-2 is the titanium-bearing NE 8635.

New Equipment...

Small Tools and Cutters

... Recent developments in cutters, grinding wheels, holding fixtures, fastening devices and markers are described in the following pages.

A DETACHABLE cutter block has been developed by *Gairing Tool Co.*, Detroit 32. The block con-

clearance and a minimum of contact area between wheel and work. Since the diamond section is mounted on the periphery of the core, only the inside of the core requires dressing as the diamond section wears away. Type 660B, shallow dish wheel, is 6 in. in diam.



tains fully adjustable blades. Made to engage both sides of the precision ground flats on the boring bar, it is said to quickly and accurately center itself. When located, the cutting thrust pressure is evenly distributed against the back and bottom of the slot. The block is fitted with high speed steel, cast alloy or cemented carbide tipped blades.

Diamond Wheels

TWO diamond wheels, one doing a special form grinding job and the other sharpening all types of multi-bladed cutters have been announced by *J. K. Smith & Sons, Inc.*, 157 Chambers Street, New York. The two wheels are said to provide maximum

Grinding Wheel

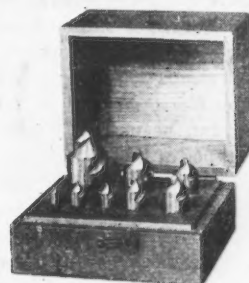
A CYLINDER-TYPE grinding wheel with hexagon hole or inside diameter, known as the Hexilin-



der has been announced by *American Emery Wheel Works*, Richmond Square, Providence 1. The wheel, 18 x 5 x 2 in. rim, is designed to take heavy cuts with low power consumption due to the shearing action of the cutting face. The wheel is said to function as well on steel or cast iron, the hexagon inside diameter of the wheel providing for proper distribution of the coolant and thereby reducing to a minimum the grinding heat generated. The wheel is designed for mounting on a Blanchard grinder.

Twin-Fluted Countersinks

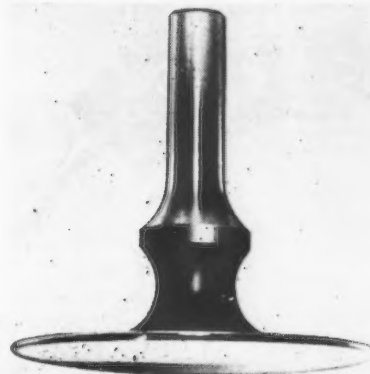
TWIN-FLUTED countersinks recommended for cutting aluminum, magnesium, steel, plastics, plywood, etc., have been announced by *G-robet*



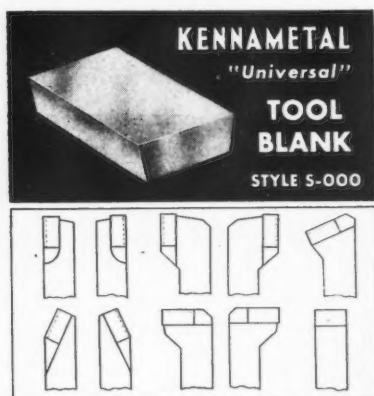
File Co., 421 Canal Street, New York 13. There are eight countersinks to the set, giving a full range of six sizes with duplicates in two sizes. Each one is guaranteed against chatter-marks. They come in a wood box with an individual pocket for each size.

Rivet Set

A FLUSH rivet set with an over-size 2½ in. face for use on extremely thin sheet or light substructure.



tures has been announced by *Aero Tool Co.*, Burbank Calif. Called the "No-Ding" set and specifically designed for production jobs where dinging is difficult to avoid, the tool is 2½ in. long. The face of the set is slightly crowned and the edge blended to a very smooth radius.

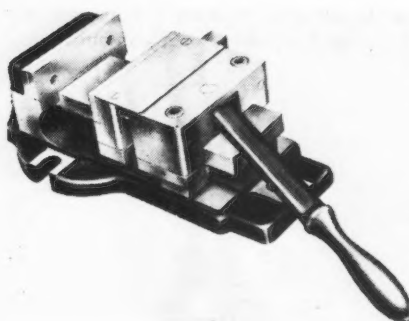


Carbide Tool Blanks

RECTANGULAR in shape with 12 deg. clearance angle formed on one long edge, "Universal" tool blanks, Style S-000, have been announced by *Kennametal Inc.*, Latrobe, Pa. They can be used to make many different types of tools by setting them into open-end recesses as illustrated. They are available in all recognized standard sizes, having thicknesses of 3/16 in. or more. Many sizes are stocked in steel cutting grades.

Machine Vise

A VISE, operating on the wedge-lock principle, has been developed by *Universal Engineering Co.*, Frankenmuth, Mich. A 15 deg. pull on the locking lever clamps work in the vise and a second pull of only 7 deg. locks the piece ready for produc-



tion. Pressure is applied to the adjustable jaw through taper wedges. Interlocking teeth on the bottom of the slide and jib keep the adjustable

jaw in place. The splined roller contact of sliding jaw permits exact adjustment for any size piece. The vise is made in three sizes with 4, 5 and 6 in. jaw width.

Indexing Fixture

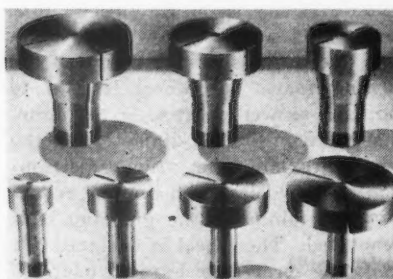
A SHORT type indexing fixture for small milling machines using only the standard 5-C pull type collet has been announced by *Zagar Tool Inc.*, 23880 Lakeland Boulevard, Cleveland 17. It is said to eliminate the complicated setups required to index work around 360 deg. of a circle. A 4, 6 and 8 division index plate is included as standard equipment. All others as well as staggered or unusual divisions are extra. Since the collet



has no vertical movement, it is well suited for milling slots, straddle milling, etc., where duplication of parts is required. A pipe tap hole is provided in the side of the fixture for running cutting oil under pressure to the work.

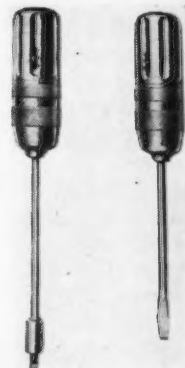
Step Collets

OVER capacity step collets available for both 1 and 2 in. Zagar collet fixtures have been announced by *Zagar Tool Inc.*, 23880 Lakeland Boulevard, Cleveland 17. The 2 in. collets (Zagar tool No. 301) are made in 3, 4 and 5 in. head sizes; the 1 in. collets in 2, 3, 4 and 5 in. head sizes. The 2 in. collets can be used wherever a Type 5-C collet is used. The heads are 1 in. thick and made out of M tempered tool steel, are finish ground complete and are left in soft condition so that they can be bored to the individual job.



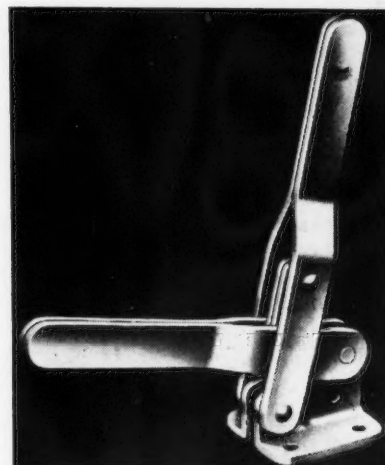
Rotary Torque Tool

A ROTARY torque tool developed to eliminate the danger of over or under tightening, thread stripping or material damaging on rotary operations has been announced by *Richmont, Inc.*, Los Angeles 55, Calif. The driver handles screws, small nuts and bolts in torque ranges of from 1 to 25 in.-lb. Because the driver disengages at the proper predetermined torque, it is impossible for the operator to tighten beyond the prescribed set. Adjustment is made by rotating a set screw in the head of the tool and indication of the torque setting is visible on the exterior. The driver is manufactured in two models, one with the screw drive as an integral part of the shank, the other with a ¼ in. square drive. Standard models are 7¾ in. long and have a 1.30 in. diameter handle. Larger drivers in higher torque ranges are available as desired.



Toggle-Action Clamp

FOR use where extraordinary pressure is required for clamping at an angle to the base mounting, a toggle-



gle action clamp, Model KV-221, has been designed by *Knu-Vise Inc.*, Detroit 16. It can be used inside of jigs where operating space may be limited and can also be used as a locating device in progressive drilling fixtures. The clamp weighs 23 oz. and measures 7½ in. in height and 6½ in. in length. Recommended load at the end of the standard toggle bar is 240 lb.

"STRUCTURE" CONTROL *by* OILGEAR

In Famed Direct Casting Process

Another Typical Example of the Versatility of this Universal Power Medium

Most successful of all continuous casting methods, on the basis of tonnage produced*, is the famous "Direct Casting" process which "has long been the object of a lively multilateral interest." Here, Oilgear Fluid Power, the versatile method of applying and transmitting power, is used . . . not only to tilt the pouring ladle and to move the hydraulic lowering table, but to provide the crucial control of lowering speed which in part determines the metallurgical structure of the alloy being cast.

The success here of Oilgear Fluid Power—used in almost every Direct Casting machine in the country—is another typical example of the fact Oilgear Fluid Power can be used in limitless ways and to solve an endless variety of power and transmission problems. Regardless of what your machine or process power problem is, you should investigate Oilgear Fluid Power . . . now, while there is still time for such preliminary work. Why don't you outline your needs to Oilgear engineers . . . today? THE OILGEAR COMPANY, 1303 W. Bruce St., Milwaukee 4, Wisconsin.

*The Iron Age, February 24, 1944, pages 56 to 65.

ARE YOU TRYING TO:

1. Apply large forces through long . . . or short . . . strokes at variable speeds?
2. Obtain automatic work cycles, variable speeds in either direction . . . with or without pre-set time dwell?
3. Apply large forces through continuous or intermittent reciprocating cycles at constant or variable velocities?
4. Obtain extremely accurate control of either position or speed of a reciprocating member?
5. Apply accurately variable pressure either static or in motion?
6. Closely synchronize various motions, operations or functions?
7. Apply light . . . or heavy . . . forces at extremely high velocities through either long or short distances of travel?
8. Obtain continuous automatic reversing drives at constant R.P.M. or over a wide range of speed variation?
9. Obtain accurate remote control of speed and direction of rotation, rates of acceleration and/or deceleration?
10. Obtain constant horsepower output through all or part of a speed range?
11. Obtain automatic torque control?
12. Obtain accurately matched speed of various rotating elements?
13. Obtain constant speed output from a variable speed input?
14. Obtain full pre-set automatic control, elimination of problems of shock, vibration, etc.?

You Need Oilgear!



Type of Oilgear Fluid Power equipment used not only to tilt pouring ladle in Direct Casting Process but to lower hydraulic table below molds at rate of speed required to produce the proper rate of ingot cooling, hence, metallurgical structure . . . a dramatic example of the unique speed control Oilgear affords.



Fluid Power

• Pictures of new 1946 Fords are released, and show redesigned front ends; new truck model specifications include interesting mechanical changes. . . Ford steel mill output will gain after erection of new stripping building.



DETROIT—Ford Motor Co. won a moral victory in the reconversion race last week-end when it broke into print—and very considerable print at that— with pictures of its 1946 postwar model, to go into production sometime in the next few months. This publicity scoop may be followed by a more concrete "first" when production really begins, because Ford seems to be in about as good a position for reconversion as any of the automobile entries.

The 1946 model pictures are about as informed circles expected them—definitely modified from the 1942 model predecessors, but still bearing close relationship. On close study it would appear that fenders are unchanged. Hood line have been tapered only slightly, but entire newness is lent the appearance of the vehicle by the disappearance of the 1942 grille, which was made of slim vertical bars, in favor of a much heavier grille of solid-looking horizontal sections which echo the bumper lines.

Indications are that the interior has been widened somewhat, although this cannot be definitely ascertained from the photographs. Design of the inside, however, has been changed quite a bit. A new dashboard is provided. So is a smartened two-toned upholstery fabric—whose exact details and specifications, however, may still be uncertain factors due to the vagueness of textile availability.

Under the hood Ford probably will have more changes than many of its



FORD MANUFACTURING HEADS—A photograph of Walter P. Reuther, general secretary for June 20, and a photograph of Henry Ford II, president of Ford Motor Co., in a manufacturing responsibility unit. Ford Motor Co. has a 10,000,000 sq. ft. plant in Detroit, Mich. The plant includes the following departments: body, electric furnace, foundry, machine shop, gear and pinion building, jacking and magnetizing, foundry, motor building, press shop, production, powder, spring and steel building, steel foundry, pattern shop, finished products building, paint and metal, among others. Functions are also in the electrical, blast furnace, pipe, cast, core oven, locomotive and construction, storage, tool and die, domestic assembly branches, tool stock and steel.

competitor, due to its wartime engine-making experience and attendant changes in facilities. In recent weeks Ford officials have been promising their dealers scores of mechanical improvements. Those to be contained in the forthcoming passenger cars can be doubtless forecast reliably by examination of the changes in the 1946 model civilian trucks recently started in production.

The most interesting new feature of the truck engine is the tri-alloy type of connecting rod bearings, which are said to increase bearing life approximately 250 per cent. These bearings are cast of copper, lead and silver, produced in a continuous process described in detail in *THE IRON AGE*, March 29, 1945, p. 50. It is fairly definite that these same bearings will appear on the passenger cars.

Engine lubrication has been improved in the new Ford truck engines by an increase of oil volume and pres-

sure, a change from 12 to 16 in military experience. Another direct result of wartime experience is a larger number of synthetic rubber parts, listed as a definite advance because of the resistance of synthetic to grease and general deterioration. Valve seats are cooled better, increasing the amount of cooling at this point.

Improvement in economy is shown in the new Ford truck engines. The new engine has a higher compression ratio, bearing, and a new type of bearing, made of a new material, and a new type of bearing, made of a new material, and a new type of bearing, made of a new material.



RECONVERSION

HELP

Pratt & Whitney engineers are ready to put their backlog of knowledge and experience to work for you on any or all of your tooling problems.

It may be only a small "hitch" in your plans... or it may be a major undertaking. But it may save time and money to call in Pratt & Whitney at the outset. Our engineers are trained to tackle just the type of tooling problems you will run up against. That's their specialty. It has been for years.

You can gain much help from the Pratt & Whitney tooling department concerning all our products and our long line of gages, and our tools. In fact, many of our customers have discovered new ways to cut corners and increase production simply by going through our catalogs. We will be happy to send you any of our literature you may request.

For your convenience, we are once again maintaining stocks of all standard small tools and gages at our branch offices. As your reconversion plans take concrete form, we are sure that this added convenience will help simplify your problems.

Please feel free to write or contact us at any time. Our entire organization is geared to give you the help you want, when you want it.

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Tooling Department
1000 Main Street, Hartford, Connecticut

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Design, Development and Production
1000 Main Street, Hartford, Connecticut
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Assembly Line . . .

STANLEY H. BRAMS

• Pictures of new 1946 Fords are released, and show redesigned front ends; new truck model specifications include interesting mechanical changes . . . Ford steel mill output will gain after erection of new stripping building.

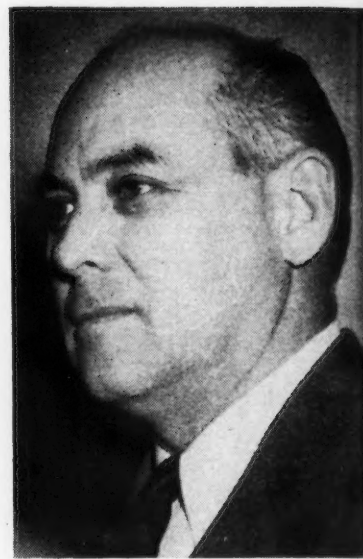


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FORD MANUFACTURING HEADS: Shutdown of Willow Run, now scheduled for June 30, has brought M. L. Bricker, left, back to River Rouge to divide manufacturing responsibilities within Ford Motor Co. with R. R. Rausch, right. Operations now under Bricker include the aircraft building, armor plate, electric furnaces, foundry machine shop, gear and axle building, jobbing and magnesium foundries, motor building, press steel production foundry, spring and upset building, steel foundry, pattern shop, Highland Park and Lincoln. Rausch will handle, among other functions, the steel mill, open hearths, blast furnaces, pig cast, coke ovens, locomotive shop, construction, salvage, tool and die, domestic assembly branches, tool stock and others.

competitors, due to its wartime engine-making experience and attendant changes in facilities. In recent weeks Ford officials have been promising their dealers scores of mechanical improvements. Those to be contained in the forthcoming passenger cars can be doubtless forecast reliably by examination of the changes in the 1946 model civilian trucks recently started in production.

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Improved oil economy is claimed for the new engines through the addition of an improved type of rear main-bearing seal, said to virtually eliminate possibility of oil loss at this source. Aluminum pistons have four rings each instead of three, providing greater oil economy. Heavier wrist pins indicate increased strength. The crankshaft pulley on all models is now made from one piece of steel, replacing the two-piece spotwelded assembly formerly used.

Servicing on transmissions has been facilitated by installing washers between the large cluster gears and



RECONVERSION

H E L P

Pratt & Whitney engineers are ready to put their backlog of knowledge and experience to work for you on any or all of your tooling problems.

It may be only a small "hitch" in your plans . . . or it may be a major undertaking. But it may save time and money to call in Pratt & Whitney at the outset.

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PRATT & WHITNEY

Division Niles-Bement-Pond Company

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transmission housing. On 1½ ton models, servicing is further facilitated by using a removable section in the oil pan, permitting replacement of the clutch without removing the entire pan.

Ford is presently producing a commercial car of 114 in. wheelbase and 1½ ton vehicles of 134 and 158 in. wheelbases. School bus chassis of 158 and 194 in. wheelbases are also in production. All are powered by the heavy-duty Ford V-8 truck engine, displacing 239 cu. in., built to compression ratio of 6.40 to 1, and developing 100 hp. at 3800 rpm.

Steel production at Ford, it should be noted, will be increased approximately a third by construction of a new stripper and mold preparation building authorized by the War Production Board, to be located east of the open hearth building at the Rouge.

Under present conditions, ingots are poured at the open hearths and then moved by locomotive to an area directly adjoining the soaking pits. Should any delay ensue at the pits, or should the track there be occupied with cars, the ingots must be held out of doors and, of course, lose heat rapidly. This necessitates holding in the

soaking pits for considerably longer than would be the case if the ingots could be stripped as soon as they began to solidify. As a result, soaking pit capacity is a bottleneck which has been holding open hearth production at River Rouge below 60,000 tons of steel per month.

The new construction and facilities will permit the ingots to be moved in small cars directly from pouring stations to the stripping building, after which they will be immediately transferred to the soaking pits. Soaking time is expected to be reduced thereby to around 2 hr. and an increase in tonnage to about 78,000 tons per month is anticipated.

This program, to cost \$856,500, will coordinate well with the rebuilding of the soaking pits at Ford, now begins. No. 1 soaking pit was rebuilt late in January and can now handle about 20 tons of ingots per hour. No. 8 soaking pit is temporarily rebuilt and now accommodates 12.2 tons of ingots per hour.

It was originally intended to tear down Pit Nos. 2 and 3 as soon as this work was completed, but due to the pressure for production, the rebuilding of these pits has been delayed until later this summer. It is hoped



NEW ASSIGNMENT: J. M. Crawford, chief engineer of the Chevrolet Division, has been transferred to the central office engineering staff as assistant to C. L. McCuen, vice-president. Mr. Crawford, president of the Society of Automotive Engineers, became chief engineer of Chevrolet in 1929.

HERE IT IS: This is the 1946 Ford—first postwar car to be unveiled by any automobile maker. The picture is of a handbuilt model. Production of an initial allotment of approximately 40,000 units between now and the end of the year will be underway by late summer. By early winter Ford will be producing at a rate somewhere around 600 units daily, with initial output concentrated at River Rouge, Edgewater, N. J., Louisville and Dallas, where assembly lines have in part been occupied turning out war vehicles, and hence are in good shape for changeover. The view of the new Ford is interesting on many counts—it indicates bright metal, rather than painted molding; will be used in spite of shortage of die casting facilities; it offers obvious refinements of line over 1942's. Interiors have been refined also, with two-tone fabric treatments shown, broadcloth upholstery, smartly designed plastic dashboards, ring type wheel horn, and other improvements.



62—THE IRON AGE, June 7, 1945

that by then the new stripping and mold preparation building will be finished, and if this is available the shutdown of the second part of soaking pits will be compensated for by faster soaking time in those remaining in operation, continuing tonnage output at unchanged levels.

Ford has ten soaking pits, one of which is utilized more as a temporary holding pit than as a soaking pit. As the matter stands, all these except Nos. 1 and 8, now rebuilt, are old, except for No. 10, which is used for holding purposes.

Fisher Gets More B-29 Work

Detroit

• • • Additional B-29 work has been awarded to the Fisher Memphis Aircraft Division for the manufacture of bomb bay, main wheel and nose wheel doors, with first shipments scheduled in September.

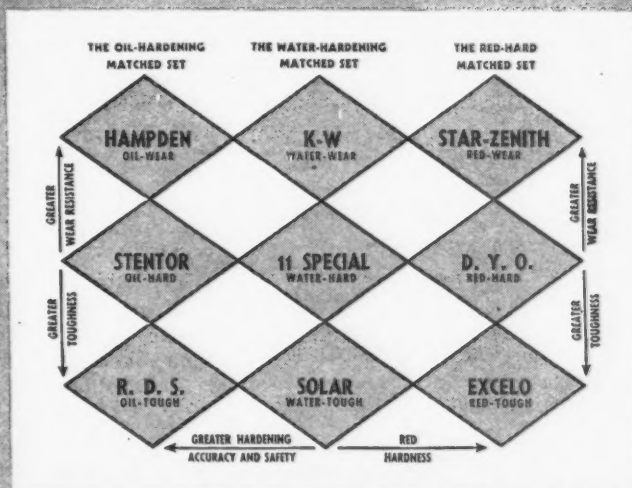
In addition, George C. Patterson, general manufacturing manager and director of the Fisher aircraft section, announced that fabrication of cloth covered surfaces for B-29 rudder, elevator and aileron assemblies will be transferred from the Fisher Lansing Division to Memphis.

5 WAYS This Diagram Helps You Boost Output and Cut Tool Costs...

Hundreds of Tool Engineers use the Matched Set Method to get better tools that cut production costs. The steels shown on this Diagram will solve 90% of your tool room problems.

The Carpenter Matched Set Method Gives You These Advantages...

- 1 With the Diagram as a guide, it is easier to select the proper tool steel for a job.
- 2 If a tool steel fails to meet the job requirements, the Tool Engineer knows where to go on the Diagram to correct the trouble.
- 3 Tool steel inventories are reduced and simplified because there are fewer steels to use.
- 4 Heat treating problems are minimized by using only a few steels.
- 5 New men on the job can get better results faster when they have this definite system to follow.



ALL THIS **Plus** the fact that simplified selection and heat treatment of tool steels means tools that stay on the job longer and cut production costs.

How To Put This Method To Work On Your Tool Steel Problems...



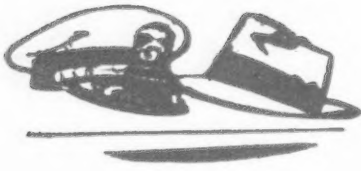
Ask for your copy of the *Carpenter Matched Tool Steel Manual*, free to tool steel users in the U.S. A note on your company letterhead, indicating your title, will start the Manual and its 80-page Tool Index and Steel Selector on its way. Use your *Manual* to simplify tool steel selection and get better heat treating results. Write today.

Carpenter MATCHED TOOL STEELS

THE CARPENTER STEEL COMPANY
121 W. Bern Street, Reading, Pa.



• An expected victory is scored by the Administration in its drive for renewal and broadening of the Reciprocal Trade Agreement Act, but Senate hearings indicate the act may be trimmed down.



WASHINGTON—Passed in the House by a 239-to-153 vote, the administration scored an expected victory in its drive for renewal and broadening of the reciprocal trade agreement act, but hearings last week before the Senate Finance Committee have left the impression that the measure may be trimmed. In the House the bill was passed as reported by the Ways and Means Committee—without any change—on a strictly partisan basis, except for the 33 Republicans who joined the Democrats in voting for it as against the 140 Republicans who lined up in opposition to the measure.

The Senate line-up is expected to be of a more bi-partisan character with some Democrats particularly from the South, opposing it as it now stands. While its passage in the Senate is assured there are predictions that it will be only after Section 2 has been either modified or eliminated by the Finance Committee or in the Senate itself.

It is this action that was the source of the bitterest House attack and which arouses the strongest Senate opposition. It would give the State Department authority to cut tariff rates existing on Jan. 1, 1945, another 50 per cent even though they had been previously reduced by that or a lesser amount. To grant this authority, say opponents, will upset the country's postwar economy after the world has returned to normal production. Administration forces contend that the reverse would be true.

Particularly strong opposition to this power to slash tariffs by a total of 75 per cent under their original rates came from the metal mining interests. Other producers of raw materials also protested strongly against this additional authority being granted. The protests from these sources indicated an especial apprehension that, while it may take some time to resume broad scale manufacturing in countries torn or devastated by war, there is a threat of heavy import of raw materials that will become immediately available or nearly so because mines or quarries will require little if any rehabilitation.

Because of this and other opposition it is the belief that this authority may be pared in two to limit it to 25 per cent unless it is altogether eliminated. There may also be a vigorous effort as there was in the House to limit the act's extension to one year rather than to extend it for three years as is now proposed. Proponents of the bill attempt to justify a three-year extension on the plea that it will take that long for many countries to resume volume production and to get the so-called benefits of the agreements.

There were attacks also on other features of the act but for the most part they were a reiteration of previous criticisms, which even though meritorious, have been unavailing. Included in this category of criticism was the fact that the act does not provide for bi-lateral agreements, but that concessions extended in an agreement with a single nation automatically are granted all "most favored" nations without the latter granting any concessions whatever.

There were also attacks on the establishment against the United States of quota system, sterling blocs and preferential tariffs but they too were futile. Answers were made that the act itself provides for safeguards against these practices but a counter reply was that these safeguards, including an anti-dumping clause (a cumbersome affair), are never applied.

The act undoubtedly was given considerable support by President Tru-

man's assurance that it will not be used to endanger any segment of American industry, agriculture or labor.

* * *

To apply only to claims for fair compensation for termination of contracts but not for claims for goods delivered prior to termination, Robert H. Hinckley, Director of Settlement, has issued two new regulations that are designed to speed and improve contract settlement. Regulation 16 deals with company-wide settlement. Regulation 17 provides methods of protecting payments to subcontractors in cases where the higher tier contractor is insolvent.

Under the company-wide settlement plan, one contracting service, bureau or operating unit will be assigned to settle directly with the company all of the company's claims, even though they arise under contracts of many procurement offices. Director Hinckley said that the Office of Contract Settlement is convinced that the company-wide program will apply to a limited number of cases and be of great value for speeding payments. Application of the procedure, he said, will minimize duplication of effort in processing claims, excessive paper work, lack of uniform treatment from various customers and slow payment of claims.

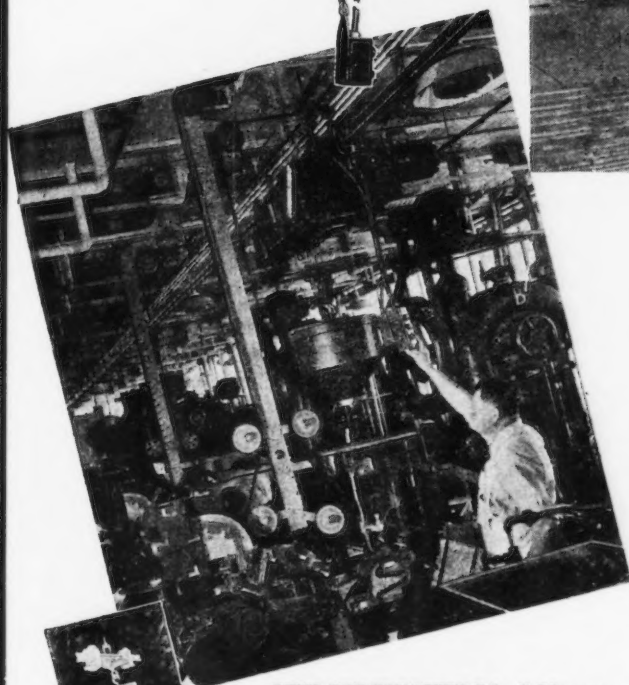
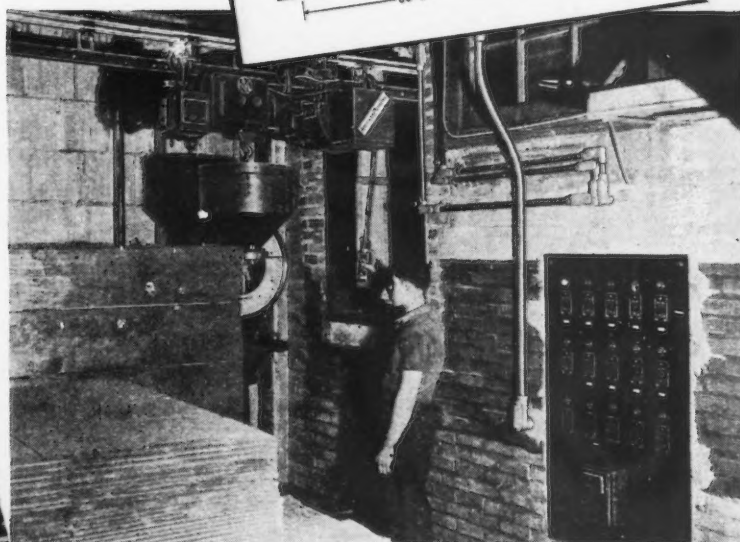
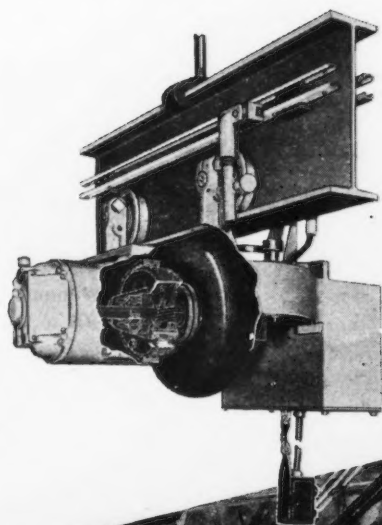
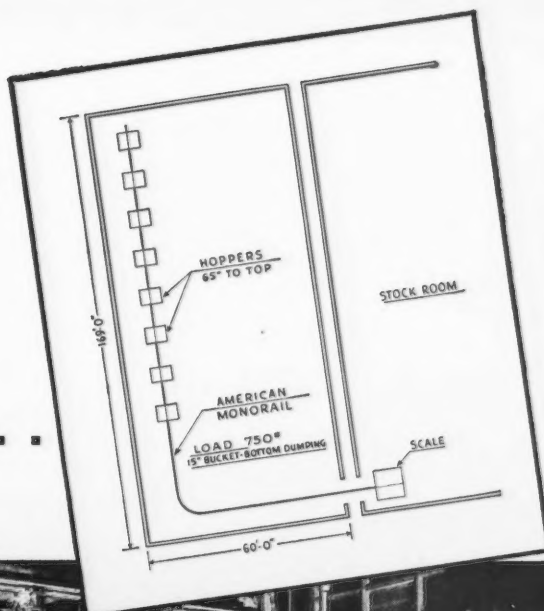
Regulation 17, he pointed out, permits subcontractors to make application to contracting agencies for direct payment or settlement of their claims in cases where their customers are insolvent or in danger of becoming so.

A committee of three, consisting of representatives from the War and Navy Departments and the Office of Contract Settlement, will select companies for company-wide settlement upon application of the company through a contracting agency. For the present it is expected that only the War and Navy Departments will be organized to conduct settlement on a company-wide basis. Generally speaking, the companies selected will be those that have a large number of subcontracts with many different customers and which have demonstrated an ability to handle claims of their subcontractor expeditiously. Settle-

American MonoTractor

Automatically

Feeds 15 Stations



SEND FOR BULLETIN C-1. A 56 page book showing successful applications of American MonoRail Systems.

HERE is an American MonoRail System that is almost human. By remote control, semi-precious metal is delivered to fifteen tube-forming machines.

After dispatcher fills container with slugs he carefully check-weighs the load and dispatches it to one of the 15 machines. Operator at machine where carrier stops automatically unloads the metal slugs by push-button control and returns carrier to central station. All handling operations are performed through signal lights and push-button switches. American MonoRail Systems are not all so complicated. But all do the handling job for which they are designed — better, quicker and at great saving in cost. An American MonoRail engineer will gladly tell you how it will work in your plant.

THE AMERICAN MONORAIL COMPANY

13103 ATHENS AVE.

CLEVELAND 7, OHIO

THE IRON AGE, June 7, 1945—85

ments will cover both prime contracts and subcontracts of the companies selected. One of the criteria for the selection of companies is that the volume of their war business and termination claims is large enough so that this method of settlement will result in an economical use of government personnel.

Both regulations provide that subcontractor settlements may be made directly by the government without taking into consideration offsets held by the government against higher tier contractors, or offsets between higher tier contractors. Likewise, these direct settlements need not take into account insolvency of higher tier contractors or assignments made by them. An opinion of the Attorney General has concluded that this is in accordance with the Contract Settlement Act of 1944.

* * *

It looks as though President Truman, barely acclimated to the White House atmosphere, is about to get his first big bump at the hands of Congress. Reaction to his message asking federal standards of unemployment during the reconversion period was unfavorable. About as far as Congress seems willing to go is to vote jobless benefits for federal workers not now covered by state social security. This would include em-

ployees in the Maritime service, federal shipyards and arsenals.

Last year in response to a request by the late President Roosevelt, the Senate voted jobless benefits to these employees, but the House rejected it. Both the House and the Senate turned thumbs down on proposals for the unemployment of a federal weekly standard up to \$35, based on previous earnings and dependents. There was a general feeling then that compensation payments outside federal workers not now covered is a job for the States, not the Federal Government.

President Truman in his recommendation for his measure as emergency legislation asked for a nationwide standard of at least \$25 weekly for 26 weeks to be paid workers made

idle during the transition period.

Senator George, Finance Committee Chairman, who drafted the Senate bill of last year, expressed a willingness to provide a standard payment to federal employees for a limited period but said that he doubted if Congress would go beyond the \$20 a week established by the GI Bill of Rights. The Senator who said he would discuss the proposed legislation with the President, also indicated opposition to the White House recommendation to extend a uniform federal standard to all workers. A definite coolness to the legislation as asked by the President was also shown by Chairman Doughton of the Committee on Ways and Means which will grapple with the problems on the House side.

Wire Requirements Cut Not to Affect Labor

Washington

• • • The cutback in Army service requirements for communications wire from 313,500 miles monthly to 218,000 miles, in the opinion of WPB will not affect labor to any great extent because it is expected that most open capacity will be speedily filled with civilian orders. The cutback was an-

nounced by WPB at a recent meeting of the Copper Wire and Cable Industry Advisory Committee to which Copper Division officials recommended that, in order to enable WPB to maintain a flexible control over the situation, the industry submit semi-monthly reports of open capacity. This proposal, it was pointed out, is in line with procedure recently instituted by the brass mills.

The largest cutback was in field wire requirements, which were reduced from 211,000 miles monthly to 156,000 miles. Assault wire was cut from 83,000 miles to 52,000 miles and long range wire from 19,500 to 10,000 miles.

Committee members expressed concern over proposed open ending of the controlled material plan on July 1. They said they felt that it would be a mistake to control merely the portion of copper supplies for military and essential civilian uses during the third quarter and urged that an "all or nothing" policy be adopted. To this end the Committee reaffirmed its previous recommendation: that the distribution of copper for all uses be controlled between V-E Day and the end of the war against Japan. Copper Division spokesmen informed the Committee that their recommendation would be presented to higher WPB officials for further consideration.

WPB said that it is not expected that the requirements for components for wire and cable will drop with communication wire cutbacks. Textiles and enamel, it was stated, will be in short supply.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



HOW ARE SUBSTANTIAL SAVINGS ACHIEVED BY GRINDING WITH A CRUSH DRESSED WHEEL?

IS GRINDING TIME REDUCED?

Yes! On the Sheffield Precision Thread and Form Grinder with a crush dressed multi-ribbed wheel, grinding time is often reduced as much as two-thirds.

DOES CRUSH DRESSING PROVIDE A BETTER CUTTING SURFACE?

Yes! Crush dressing removes whole grains from the wheel leaving a multitude of effective cutting edges whereas diamond dressing cuts across the grains leaving flats which do not cut but do increase generation of heat.

IS CRUSHED WHEEL DRESSING FAST?

A full form can be crushed into a wheel on the Sheffield Precision Thread and Form Grinder by the special crushing device, in a fraction of the time required by conventional dressing methods. Intricate profiles requiring hours by diamond dressing, can be crushed into a wheel in a few minutes. After the original crushing of a wheel, recrushings or redressings take only a few seconds.

DOES CRUSH DRESSING REDUCE DRESSING TOOL COSTS?

The Sheffield Corporation introduced and pioneered crush dressing in this country and found from several years' experience that wheel dressing costs by this method on many jobs are considerably less than for

diamond dressing. Many dressings are possible with the crusher roll—and a large quantity of parts can be produced from one wheel dressing.

CAN CRUSH DRESSING BE USED ON A SURFACE GRINDER?

Fixtures used in mounting crusher rolls on standard surface grinders for crushing wheels to produce flat profiled work, have been developed and pioneered by the Sheffield Corporation. Sheffield engineered surface grinders incorporating crush dressing equipment as an integral part are available.

WHERE CAN CRUSHER ROLLS BE OBTAINED?

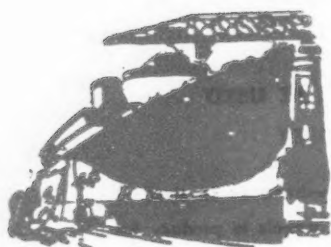
Stocks of crusher rolls for producing threads in standard pitches are maintained in stock for immediate delivery. Rolls for coarser pitch threads and for all other types of forms can be obtained from Sheffield.

WHERE CAN FULL INFORMATION BE OBTAINED?

Details on crusher rolls for immediate delivery, surface grinder crusher roll mountings, the Precision Thread and Form Grinder for producing circular formed and threaded parts and the Micro-Form Grinder for producing crusher rolls and other profiles will gladly be sent by the Sheffield Corporation, Dayton 1, Ohio, U. S. A.

Advertisement by the Sheffield Corporation

• UAW President Thomas and Henry Kaiser discuss postwar autos? Planes? Willow Run? Full Employment? Labor Management Harmony? . . . Geneva operating two turns on plates .



SAN FRANCISCO — When the president of the "world's largest union" comes to persuade the "West's leading industrialist" to take over the "world's largest production unit" there's no doubt about having a mouthful of firsts, and it may also presage industrial development of lasting implications.

R. J. Thomas, president of the CIO's United Automobile Workers last week spent the better part of two days with Henry J. Kaiser discussing Mr. Kaiser's three secret automobiles and four types of airplanes, and the possibility of the latter's taking over the Ford aircraft plant at Willow Run—which has been described by officials as "not practicable for civilian production."

Mr. Kaiser declined to state specifically that he would produce any products other than those already announced by his ramified organizations saying, "I don't wish to be specific until I am ready to move." Mr. Thomas, having already announced the meeting as one of the objectives of his western trip, allowed the hint about the secret automobiles and secret aircraft mockups to be launched like a pocket battleship out of a cellophane bag in the middle of Third and Market Streets.

Accompanied by the usual fanfare of press conferences, the meeting was held at the Kaiser Permanente magnesium plant for the inspection of the

models—still to be unveiled for public view. Mr. Thomas commented that the planes and the California-built lightweight cars were "startlingly different, but intensely practical," and pointed out that the Kaiser interests already produce many of the materials which would go into these products.

Actually the field of discussion—continued on the second day at the Kaiser offices in Oakland—covered more territory than automotive and aircraft alone. Mr. Thomas was accompanied on his trip by Alex Taube, automotive engineer, and William Nicholas, director of the housing department of the CIO—not to mention the UAW publicity manager. The Kaiser-Thomas talks dealt with the recently announced Kaiser home construction plans, as was emphasized by Mr. Kaiser at the press conferences, and concerned the broader aspects of reconversion and full employment. Mr. Thomas said he believed that shipbuilding and other cutbacks would represent more unemployment than has been officially predicted, and that the automotive and aircraft industries had no plans designed for maximum employment. The conferees jointly stressed the need for additional employment outside the groove of past thinking, and required initiative of a high type. "The kind of initiative I've found here at the Kaiser enterprises encourages me to believe that we can solve the problem on the West Coast and over the entire nation. The resources are waiting, labor is ready, and large sections of management indicate their desire to cooperate," Mr. Thomas said.

"I am trying to get Kaiser to go into the automotive field . . . and as indicated in my book, it is absolutely essential for housing to be provided for the workers in this country." Having first blown hot on Willow Run, the union official later stated, "We haven't necessarily any one plant in mind. The main thing is to have plans. No government department has any reconversion plans on the basis required. One government agency asked me if I want to buy Willow Run. I think I could get the backing, but I want to stay in the labor business . . . I am of the opinion that labor unions don't want to manage business. But

if business fails to provide the needs of laboring men, then something unusual might happen—but only then." Mr. Thomas believes that Mr. Kaiser is in a position to jump into the breach of cutbacks and cancellations, and take up a sizeable portion of the unemployment slack. He emphasized the need for breaking away from the tradition of sectional rivalry and agreed with Mr. Kaiser that "monopoly does not think nationally and rejects cooperation."

"No one part of the country," he said, "is going to be self-sustaining at the expense of any other part, any more than this nation can live apart from the rest of the world and flourish. We want to see every factor for jobs and security put to good use, regardless of its location. The automobile and aircraft workers do not think in terms of Los Angeles or Detroit or any one spot. Instead we're concerned with the whole production picture and the greatest possible number of consumers. That makes every section vital to us."

If Mr. Thomas made an unprecedented move in coming to Mohamet, it is not incongruous in view of Mr. Kaiser's facility for setting the pace with somewhat unprecedented moves of his own. And to put the question squarely before the house: If he owns cement, gypsum, magnesium and steel plants and he doesn't build houses, airplanes and automobiles with them, then what is he going to do with them?

If the implications of this question stand the test of probability, along with Mr. Kaiser's comment that the matter requires government approval and release of material, then it would seem to be not as much a matter of "whether?" as of "when?"

* * *

Principally as a result of severe cutbacks in requirements for shell billets, the structural mill at Geneva was shut down May 29. Most of the 200 workers have been absorbed in other departments. The plate mill is operating two turns, six days a week, with present schedules anticipating production well into the third quarter. Two of the three blast furnaces and six of nine open hearths are in operation. Pressure is steadily generating both in Utah and in Washington

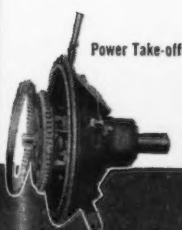
No Job

FOR A NOVICE

Riding herd on a pond full of pine is *no job for a novice!* Here's work that calls for a rare combination of judgment, balance and agility . . . a combination born only of long years in the woods.

When it comes to the development, manufacture and application of improved products for the efficient transmission and control of power, here, again, it is experience that counts!

It is for this reason that many industrial equipment manufacturers are now relying on Twin Disc Clutches and Hydraulic Drives to solve their *power linkage* problems. They know Twin Disc's 26 years of specialized experience is their assurance of products soundly designed and precision-built to insure long wear-life and profitable use. If the equipment you build calls for a connecting link between driving and driven members, you have everything to gain and nothing to lose by asking the counsel of Twin Disc engineers. Their recommendations will be unbiased and impartial as to "friction or hydraulic" . . . gladly given with no strings attached. **TWIN DISC CLUTCH COMPANY**, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).



Power Take-off



Heavy Duty Clutch



Machine Tool Clutch



Tractor Clutch



Marine Gear

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

for a decision on the disposal of the plant into private hands, so that plans for long-run conversion and aggressive solicitation of orders for present capacity might proceed, without losing workers or breaking into a presently smoothly running and balanced operation.

* * *

S EATTLE—Prof. E. B. Farquharson's four-year study in search of a "flawless" bridge to replace the Narrows structure that toppled into Puget Sound at Tacoma is drawing to a close.

The University of Washington civil engineering authority announces that his one-fiftieth-scale model of a new bridge, estimated to cost \$10,000,000, shows only one minor swaying motion in wind tunnel tests under conditions simulating a 120-mile gale. This flaw, he expects, can be ironed out during the next two weeks.

On the new model, open trusses 33 ft. in depth replace the original 8-ft. solid steel girders. A deck 50 per cent wider will provide for four traffic lanes, separated by open gratings, in place of the original solid three-lane deck. The original span swayed during as little as a 7-mile wind. The one point in present tests at which a swing motion is noted in the model is at wind velocities of 35 to 45 miles.

Steel men found interest in Seattle City Engineer C. L. Wartelle's announcement that the First Avenue South Bridge will be reconstructed and a 75 ft. high viaduct will be built from Boren Avenue and Denny Way westward to Denny Way and Eighth Avenue as part of a \$3,600,000 post-war street improvement project on which federal aid is anticipated.

* * *

Washington, home of the mighty Grand Coulee Dam and "neighbor" to its kid sister, the Bonneville Dam, is becoming "fuel poor," the State Division of Mines and Mining thinks. Sheldon L. Glover said at Olympia that the state must "either find natural gas or develop an industry for producing gas from our great fields of low-grade coal." Standard Oil of California is reported planning to drill a well in Whatcom County within the next year.

* * *

"The damndest slackers," says Admiral Vickery, "are the shipyard workers who are quitting their jobs every month," as the call goes out for

Cited for Awards

• • • The following companies have received Army-Navy "E" awards for outstanding war production:

Army-Navy "E"

Buffalo Forge Co., Buffalo (fourth star)
Sprague Electric Co., North Adams, Mass. (fourth star)
National Battery Co., Gould Industrial Division, Depew, N. Y. (third star)
Amperex Electronic Corp., Brooklyn (third star)
Babcock & Wilcox Co., New York City (fifth star)
Pangborn Corp., Hagerstown, Md. (third star)
Aro Equipment Corp., Bryan, Ohio (third star)
Taft-Peirce Mfg. Co., Woonsocket, R. I. (fifth star)
Belleville Shoe Mfg. Co., Belleville, Ill.
Carver Pump Co., Muscatine, Iowa
Caterpillar Tractor Co., Caterpillar Military Engine Co., Victory Ordnance Plant, Decatur, Ill.
Howard Mfg. Corp., Council Bluffs, Iowa
International Silver Co., Factory "P", Wallingford, Conn.
Plymouth Rubber Co., Canton, Mass.
Springdale Finishing Co., Inc., Canton, Mass.
Springdale Finishing South, Inc., Whitney, S. C.
Western Cartridge Co., Olin Industries, Inc., East Alton, Ill.
Wheaton Brass Works, Newark, N. J.

20,000 ship repair workers on the Pacific Coast.

With shipyard employment down one-third from the level of a year ago, and having gone through a more or less severe lull recently, returning vessels from the Pacific theater are now creating an urgent demand for skilled men who continue to seek peacetime employment and leave for home pastures.

Various reasons for the exodus continue to be cited including "too much postwar talk, homesickness, itchy feet, and a belief on the part of the workers that they are being kidded about the volume of repair work." For the first time in these discussions public reference has been made to the differential between the private yard wage scale and that paid by the Navy, as well as the fat overtime wages which are seldom permitted in civil service yards. One Navy spokesman admitted that this has had an adverse effect on their recruitment, but added that any change would have to originate in Washington.

Regardless of the variety of reasons to which the maladjustment may be attributed, the key to the situation would seem to be the inability of the Military to conduct a war to the pre-

cise satisfaction, chronologically and geographically, of the workmen.

* * *

L OS ANGELES—Western aircraft manufacturers, following the recent cutback in plane production, seem to be less affected than manufacturers in other parts of the country.

Somewhat confusing to the issue is the insouciance of public relation departments and government bureaus in substituting glowing predictions for the future in the place of canceled contracts, completely usurping the age-old chamber of commerce prerogative of painting roseate pictures.

While the overall national cutback amounts to 30 per cent, or 17,000 planes, in the next 18 months, from the mass of somewhat confusing figures the West Coast appears to have suffered less than the average.

Douglas needs more men to meet new production dates; North American and Northrop still need men; and Boeing's production is scheduled at a high rate with employment plans about the same.

Douglas Long Beach is to be cut to about 25 per cent of current production; Lockheed Shooting Star production will continue at Burbank but not at North American's Kansas City plant, and P-38 production is slated to continue. Rohr, San Diego, recently anticipated cutbacks by merging with Detrola Corp., and will close its Fresno plant. Ryan continues unaffected.

Army Cancels P and W, Continental Engines Muskegon Mich.

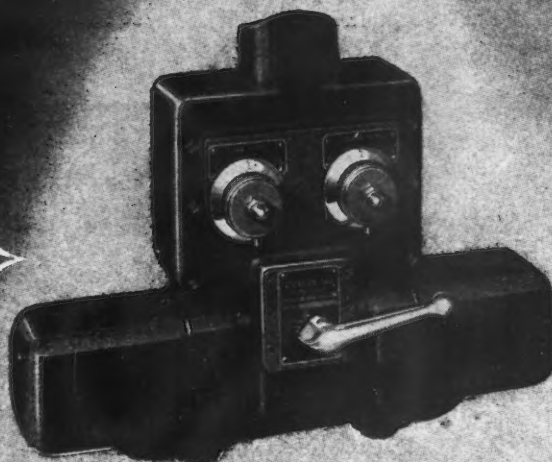
• • • The Army Technical Service Command has cancelled contracts for Rolls-Royce VE-1650 engines and spare parts being produced by Continental Aviation & Engineering Corp., a subsidiary of Continental Motors Corp. Dollar value of the cancelled contracts is approximately \$56 million, it was stated by the Army Technical Service Command.

Production of the Pratt & Whitney R-1340, scheduled to begin in June, has also been cancelled. There will be some modest rescheduling of Pratt & Whitney R-985 engines as well.

Some labor displacement is being caused by the cancellations and cutbacks, and some sources expect that when the Rolls-Royce job is wound up in the next few weeks it will eliminate Muskegon as a tight labor area and possibly put it into the classification on an area of labor surplus.

SMOOTH and CONSTANT FEED RATE

regardless of fluctuations
in work resistance or
hydraulic operating pressure



Double Solenoid Type
Push-button Operation

VICKERS "Traverse and Feed Cycle" CONTROL PANELS

These panels provide self-contained, compact control units for automatic machine applications where the cycle is a combination of rapid advance, one or two feeds, and rapid return motions. The two feed rates are infinitely variable within their ranges, and adjustments can be made during feed. Applications include drilling, reaming, boring, turning, milling and swaging machinery.

The hydraulic circuit in the panel employs the well-known Vickers Flow Control Valve in a "metering-out" circuit which means a smooth and constantly maintained feed rate for any given adjustment regardless of fluctuations in cutting tool resistance or changes in hydraulic operating pressure.

Simplicity is evident from the fact that there are only two

working parts that move. Many standard modifications are available; feeds can be in either direction or both directions; operation is by single or double solenoids integral with panel, separate solenoids or pilot pressure. Practically any cycle sequence can be obtained. See Bulletin 41-10 for complete information.

Vickers Application Engineers will gladly discuss with you how "hydraulics" can be used to your advantage.

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CONTROLS



PRESSURE
CONTROLS



CONTROL
ASSEMBLIES



VARIABLE DELIVERY
PUMPS

PERSONALS

• • •

• **William W. Shuttleworth**, previously general manager of the Warren Steam Pump Co., Inc., Warren, Mass., has been made executive vice-president. **William L. Ripley** succeeds Mr. Shuttleworth as general manager.

• **Earl Shelly** has been appointed production manager of Newman Bros., Inc., Cincinnati, succeeding **Julius Rosenthal** who was recently inducted into the Army.

• **Donald M. Fraser**, formerly assistant geologist, Bethlehem Steel Co., Bethlehem, Pa., has been appointed chief geologist, succeeding the late **W. L. Cumings**.

• **Joseph Miller** has been appointed vice-president of the engineering and production departments, Candler-Hill Corp., Detroit.

• **Bert E. Brashares** has joined the sales force of The Ohio Steel Foundry Co., Lima, Ohio.

• **David M. Gans** has been appointed technical director of the Quaker Chemical Products Corp., Conshohocken, Pa.

• **Alfred Anderson**, **Gilbert A. Bunn** and **Jack Wright** have joined Kennametal, Inc., Latrobe, Pa., as tool engineers at the Philadelphia, Detroit and West Hartford offices, respectively.

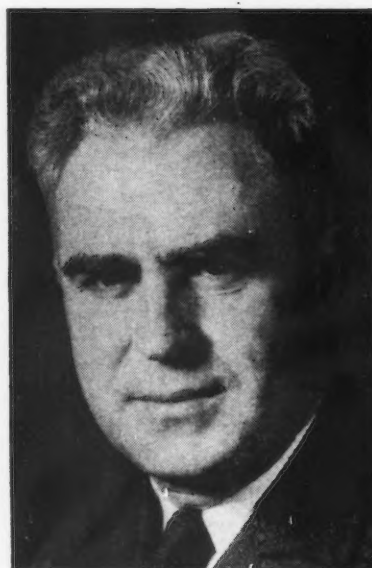
• **Paul W. Bernhard** has been appointed advertising manager of the Morse Chain Co., Ithaca, N. Y.

• **H. V. Erben** has been elected a member of the board of directors, Allegheny Ludlum Steel Corp., Brackenridge, Pa., succeeding **Ralph J. Cordiner**, resigned.

• **Eric W. Peterson** has been appointed chief engineer of the Kaydon Engineering Corp., Muskegon, Mich.

• **Boyd E. Cass** has joined the staff of the Foote Mineral Co., Philadelphia, as welding engineer.

• **A. L. Perdue** has been appointed northern California district representative for the Oliver Iron & Steel Corp., Pittsburgh.



LEO F. McCaffrey, industrial engineering specialist, Allis-Chalmers Mfg.

• **Leo F. McCaffrey** has joined the Allis-Chalmers Mfg. Co., Milwaukee, as an industrial engineering specialist to head the industrial sales department's metal industries activities. Prior to joining Allis-Chalmers, Mr. McCaffrey served as assistant works manager in charge of operation at the Algoma Steel Co., Ontario.

• **Clarence A. Trump**, formerly resident manager of the Memphis Aircraft Division of Fisher Body, Detroit, has been appointed resident manager of the Kansas City Division, and **William G. Fleischauer** has been named acting resident manager.

• **Howard D. Flicker** has been named production manager of the Long Island City plant, Salkover Metal Processing.

• **Victor R. Willoughby**, vice-president, formerly in charge of engineering, and latterly, director of research and development, American Car & Foundry Co., New York, has retired after an association of almost 50 years.

• **Dr. A. B. Greninger** has been appointed metallurgist of the chemical department, General Electric Co., Schenectady, N. Y.

• **William Seymour, Jr.**, has been elected assistant vice-president and **Merle A. Miller**, assistant treasurer of Joseph T. Ryerson & Son, Inc., Chicago. Mr. Seymour joined Ryerson 28 years ago. Since 1936 he has been general superintendent of the Chicago plant, and labor relations manager of the entire group of 11 Ryerson steel-service plants. Mr. Miller was appointed manager of the company's credit division in 1937, which post he still retains in addition to his new responsibilities.

• **Walter M. Farnsworth**, formerly divisional superintendent in charge of the Canton Steel Division, Republic Steel Corp., Cleveland, has been appointed acting assistant district manager of the central alloy district. **E. R. Johnson**, formerly the district's chief metallurgical engineer, has succeeded Mr. Farnsworth. **O. A. Bamberger** has been appointed acting divisional superintendent in charge of the Massillon Steel Division.

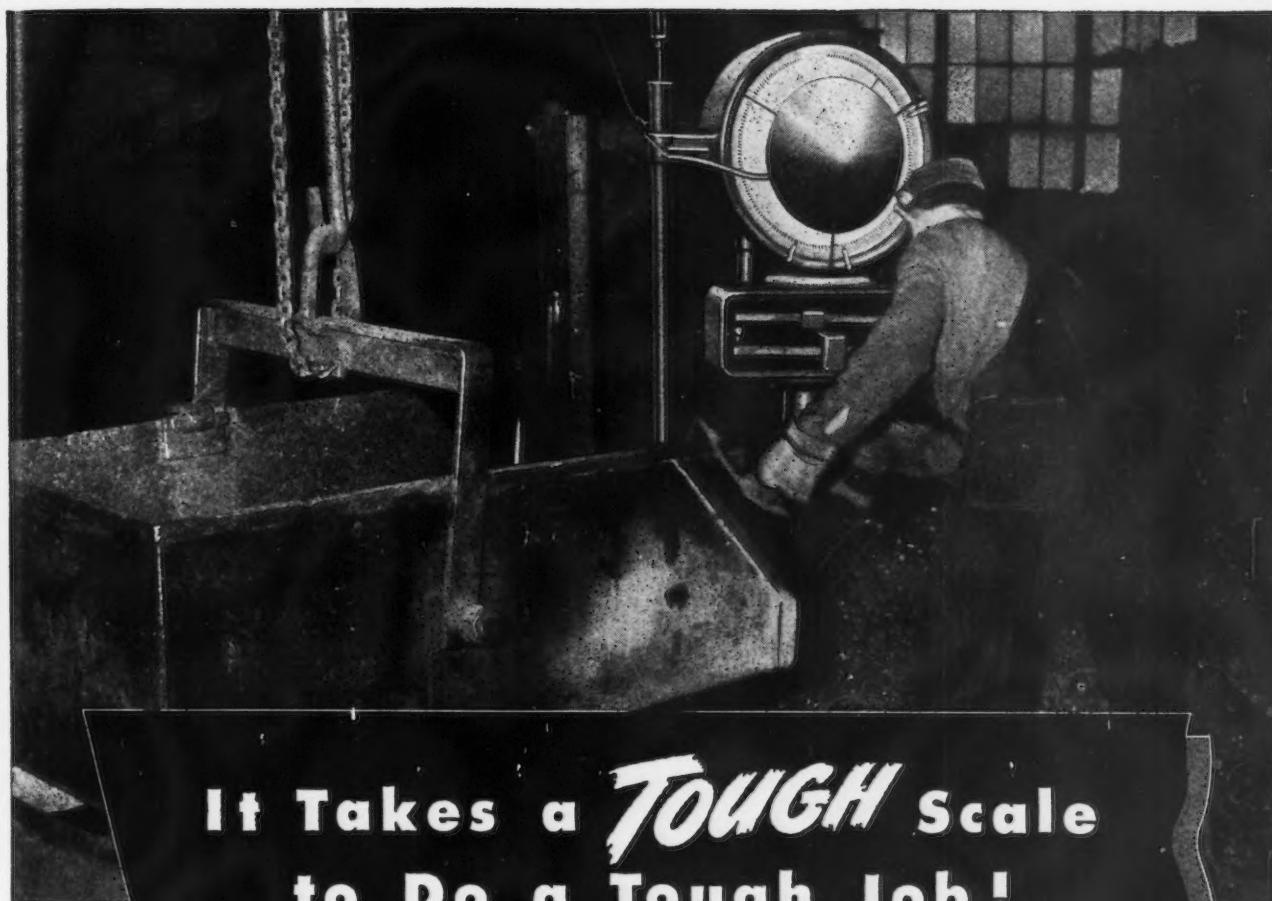
• **Robert C. Thumser** has been appointed plant engineer of Monsanto Chemical Co.'s John F. Queeny plant at St. Louis. **W. C. Durning** has been named power plant superintendent and **Norville Predock**, superintendent of maintenance and construction. **W. D. Pourie**, chief power plant engineer, has retired.

• **William J. Scott**, formerly in charge of war production at Chevrolet's Muncie, Ind., and Saginaw, Mich., plants, has been named assistant general manufacturing manager of the Chevrolet Division, General Motors Corp., Detroit.

• **Irving W. Wilson**, **Arthur H. Bunker**, **Harold J. Szold** and **A. C. Wickman**, have been elected directors of Firth-Sterling Co., McKeesport, Pa.

• **J. H. Gulick**, formerly director of purchases for Lemco Products, Inc., has been named general factory manager of the firm's main plant in Bedford, Ohio.

• **Richard H. Rowland**, vice-president in charge of the National Battery Co.'s Gould Industrial Division Depew, N. Y., has assumed the added responsibility of general sales manager, succeeding **John C. Sykora**, resigned.



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lished principles still used in modern scales. And since he began working to improve weighing, we've never stopped.

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remembering*

• **John Mitchell** has been appointed manager, products section, alloy sales division, Carnegie-Illinois Steel Corp., Pittsburgh. Formerly alloy metallurgical engineer for the corporation, Mr. Mitchell also has been chairman of the technical advisory committee, alloys and carbon steels, War Production Board; leader of the construction and alloy steels of the metallurgical and operations committee, WPB; chairman of the alloy technical committee of the American Iron & Steel Institute; and a member of the joint British-Canadian-American metallurgical committee.

• **F. D. Haberkorn** has been appointed assistant sales manager, central sales division, Caterpillar Tractor Co., Peoria, Ill. **C. A. Barabe, Jr.**, has been named assistant sales manager, eastern sales division; and **F. E. Rusher**, assistant manager of central sales since 1937, has resigned to become general sales manager and a director of Peoria Tractor & Equipment Co., Caterpillar distributor in the Peoria area.

• **Frank M. Hawley** has been appointed vice-president and general manager, and been elected to the board of directors, Morse Chain Co., Ithaca, N. Y., and Detroit, Mich. Mr. Hawley, formerly manager of the Detroit plant, has been associated with Morse Chain since 1919. He succeeds **C. J. Kenerson**, who has retired as active head and continues as a director and vice-president. **Stanley B. Waring**, former secretary, has been elected secretary and treasurer.

• **Fred M. Sime** has been appointed district sales manager for the Pacific Southwest, Macwhyte Co., Kenosha, Wis., with headquarters at San Francisco. **William J. Brett**, who will have headquarters at Portland, Ore., has been appointed district sales manager for the Pacific Northwest.

• **Nolan E. Watkins**, formerly assistant to the division superintendent, tin mill, Gary sheet and tin mill, Carnegie-Illinois Steel Corp., Pittsburgh, has been appointed director of safety in the sheet and tin mill industrial relations department.

• **Marvin Gardner** has been appointed sales engineer at Dallas for the Ilg Electric Ventilating Co., Chicago, and **George A. Innes**, sales engineer at the Philadelphia office.

• **Carl E. Lebeck** has been appointed district manager for the San Fran-



JOHN MITCHELL, manager of products section, alloy sales division, Carnegie-Illinois Steel Corp.

cisco and northern California area of the Soule Steel Co. Mr. Lebeck formerly was district manager for Truscon Steel Co., Minneapolis.

• **C. E. Stephens**, vice-president of the Westinghouse Electric Corp., Pittsburgh, has retired from active service with that company after 45 years of service.

• **A. L. Scaife** has been appointed advertising and sales promotion manager of the appliance and merchandise department, General Electric Co., Schenectady. Mr. Scaife succeeds **B. W. Bullock**, resigned. **George B. Park** has been named assistant manager of the division and **E. F. Vickery**, operating manager.

Bureau of Mines Names Merrill in New Appointment Washington

• • • The appointment of **Charles White Merrill**, a mining engineer, as chief of the Metal Economics Division of the Bureau of Mines was announced recently by **Dr. R. R. Sayers**, Director of the Bureau.

Associated with the Bureau since 1928 when he joined the staff of the Economics and Statistics Branch as a mineral economist, Merrill has served as supervising engineer of the Bureau's Economics and Statistics office at San Francisco since 1933. He has written extensively on the economics of mining in the Western States, particularly on gold, silver, copper, lead, and zinc, and has been a regular contributor to the Minerals Yearbook, the Bureau's annual review of mineral industries of the United States.

Mr. Merrill succeeds **Thomas H. Miller**, who recently was made assistant chief of the Economics and Statistics Branch of the Bureau of Mines.

In addition to its many long-established services to the metal industries, the Metal Economics Division—a unit of the Economics and Statistics Branch—now provides the War Production Board and other war agencies with information on available supplies, production, distribution, and consumption of copper, lead, zinc, iron, tungsten, manganese, chromite, scrap metal, and other metallic raw materials essential to victory. Field offices for the collection of these facts are maintained at College Park, Md., Pittsburgh, Pa., Joplin, Mo., Denver, Colo., Salt Lake City, Utah, and San Francisco.

OBITUARY...

• **Harry A. Wright**, 57, superintendent of the Sunrise, Wyo., ore mine of Colorado Fuel & Iron Corp., Denver, since 1931, died May 7.

• **Henry W. Wehr**, 72, chairman of the board of the Wehr Steel Co., Milwaukee, died suddenly, May 17.

• **C. Walter Spalding**, manager, power transmission machinery, Link-Belt Co., Chicago, died suddenly May 25.

• **Verne F. Curtis**, 46, assistant chief engineer of International Minerals & Chemical Corp., Chicago, died recently.

• **George Stupp**, 87, one of the founders of the Stupp Bros. Bridge & Iron Co., St. Louis, where he served first as president and later as chairman of the board, died recently. In 1919 Mr. Stupp became associated with the St. Louis Structural Steel Co., of which he was board chairman until he retired.

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LENGTH — Maximum length 144" depending on gage.



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● For the convenience of manufacturers, Continental Steel Corporation has published an informative new booklet... a brief, but complete, guide to the many steel products produced for manufacturers by Continental. Illustrated and described are many kinds of coated steel sheets, wire in a vast variety of specifications, steel roofing and siding, and Continental Chain Link fence. You are invited to write for a copy of this new Manufacturers Booklet... you will find it a handy source of buying information.



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ALSO, Manufacturer's Wire in many sizes, shapes, tempers and finishes, Continental Chain Link Fence, Nails, and other steel products.

Dear Editor:

LAMINATION DIES

Sir:

Please advise if it will be possible to forward us 5 copies of "Increasing the Life and Accuracy of Lamination Dies," by Guy M. Shingledecker from the May 3 issue. We wish to use these in our engineering department as we are interested in laminations and lamination dies at the present time.

W. H. BUCKLES,
Purchasing Agent
Remington Rand, Ltd.,
Hamilton, Canada

Sir:

Will you kindly furnish us with 12 reprints . . .

P. R. Hufnagle,
Buying Section Supervisor
Westinghouse Electric & Mfg. Co.,
Lima, Ohio

Sir:

Please forward 3 reprints . . .

D. E. MERRIMAN,
Purchasing Agent
Stanley Works,
New Britain, Conn.

● Reprints are on the press and will be furnished at cost.—Ed.

BAND SAWS

Sir:

Please let us know the name of the manufacturer that took over the manufacture of Napier band saws, as we understand that they are out of business.

JOHN B. MARGENOT,
President
Connecticut Iron Works,
Greenwich, Conn.

● We believe that Napier band saws are now being manufactured by Clemson Bros., Inc., Middletown, N. Y.—Ed.

HOT DIP TINNING

Sir:

Am looking for manufacturers of hot dipped tinning equipment. Can you give me their names?

JOHN Y. BELLA
1302 Cleveland Ave., N. W.,
Canton, Ohio

● A list of suppliers has been mailed.—Ed.

IMPREGNATING CASTINGS

Sir:

We would appreciate a list of references on impregnation of magnesium and aluminum castings. Also, a list of vendors who supply commercial materials for impregnation.

MIRIAM M. LANDUYT,
Research Librarian
Caterpillar Tractor Co. Peoria 8, Ill.

● We have published several articles on the impregnation of these metals. One was "Castings Impregnated by New Method," which appeared on Nov. 11, 1943. A list of manufacturers of phenolic plastic materials for impregnation of magnesium and aluminum castings has been mailed.—Ed.

IRON POWDER PARTS

Sir:

We note that you are quoting for hydrogen reduced, 300 mesh powder, 98½+ per cent iron, in drum lots, a price of 63c. per lb. It is our understanding that similar material is being sold at a considerably lower price. The apparent discrepancy in price is of some concern to us here because potential powdered iron manufacturers have been talking in terms of the value you are quoting and we feel that it does not represent the market price. We should very much appreciate your comments.

G. S. FARNHAM,
Metallurgist
Department of Mines & Resources,
Ottawa, Ontario

● Our listing of powdered irons runs from 4c. a lb. to 90c. a lb. The hydrogen reduced iron powder is an especially prepared product used for the production of electrical iron cores, as is also carbonyl iron powder. These products are required for special electrical characteristics, and the process of manufacture begins with high purity pig iron resulting in iron oxide which is hydrogen reduced to high purity iron powder. The iron powder used by most metal powder manufacturers is listed as commercial, 100 to 200 mesh, 96+ per cent iron, 12½c. to 15c. per lb. This product originates from low carbon, low alloy, scrap iron or mill scale, gas reduced to reasonably high purity iron powder.—Ed.

STEEL PILING PRICES

Sir:

I recall that steel trade papers some years ago showed not only mill but also warehouse prices on various steel items including steel sheet piling. We would be pleased to hear whether you have any records that may show the warehouse price f.o.b. Chicago on new steel sheet piling several years ago. What is the current warehouse price?

R. H. WHISLER
Mississippi Valley Equipment Co.,
511 Locust St., St. Louis 1

● We do carry warehouse prices on many items but new piling is a mill product and is not generally handled by warehouses. The mill price for piling is \$2.40 per 100 lb., f.o.b. Pittsburgh, Chicago or Buffalo. The price has not varied for several years.—Ed.

STAMPINGS SUPPLIERS

Sir:

On checking through recent issues, I am unable to find a source of supply for short run stampings. Can you help me locate firms who do specialized short run work?

H. G. CATLOW
14 Glenview Rd., North Caldwell, N. J.
● A list of suppliers is on the way.—Ed.

PRECISION CASTINGS

Sir:

RE ARTICLE "HIGH REPRODUCIBILITY IN PRECISION CAST-

ING" OF ISSUE MAY 10, PLEASE SEND AVAILABLE LIST OF PRECISION FOUNDERS IN UNITED STATES.

J. J. WARGA,
Metallurgist

Kaiser Cargo, Inc.,
Fleetwings Div., Bristol, Pa.

● We are sending a list of precision casting jobbers.—Ed.

CHAIN AND PIPE

Sir:

Prewar we were anxious to produce ball chain for plumbing fixtures, and are now eager to purchase a machine for its production. We are also interested in the production of 1 1/6 in. dia. steel pipe, welded or otherwise, whichever is the cheaper process. We wish to produce pipe in large quantities and would like your recommendations on machinery for this purpose.

P. DONALD,
Chairman
Robinson Drew & Clydesdale Ltd.,
225, Upper Thames St., London E. C. 4

● As far as we know this is a specialty item and the few manufacturers have developed their own equipment. Our suggestion is that you write any one of them with the object of becoming a licensee. In this way you will obtain assistance in producing the production machinery. Lists of bead chain manufacturers and producers of pipe fabricating equipment have been sent.—Ed.

TOOL STEELS

Sir:

In your Feb. 1 issue a "Chart of Comparable Tool Steels" was published. We would like to obtain three reprints or tear sheets.

T. H. CLACK,
Works Buyer
International Harvester Co.,
Amherst, N. Y.

● These are available at 15c. per copy.—Ed.

KIRKSITE DIES

Sir:

We should like to obtain copies of the following articles: "Cast Kirksite Blanking Dies," May 4, 1944; "Mass Production of Kirksite Blanking Dies," Jan. 20, 1944; "Kirksite Die Casting Technique," June 10, 1943, and "Cor- ing Kirksite Dies," April 8, 1943.

S. J. SEGEL
Markrite Mfg. Co.,
100 St. James St. West, Montreal

● Tear sheets have been mailed.—Ed.

PRECISION CASTINGS

Sir:

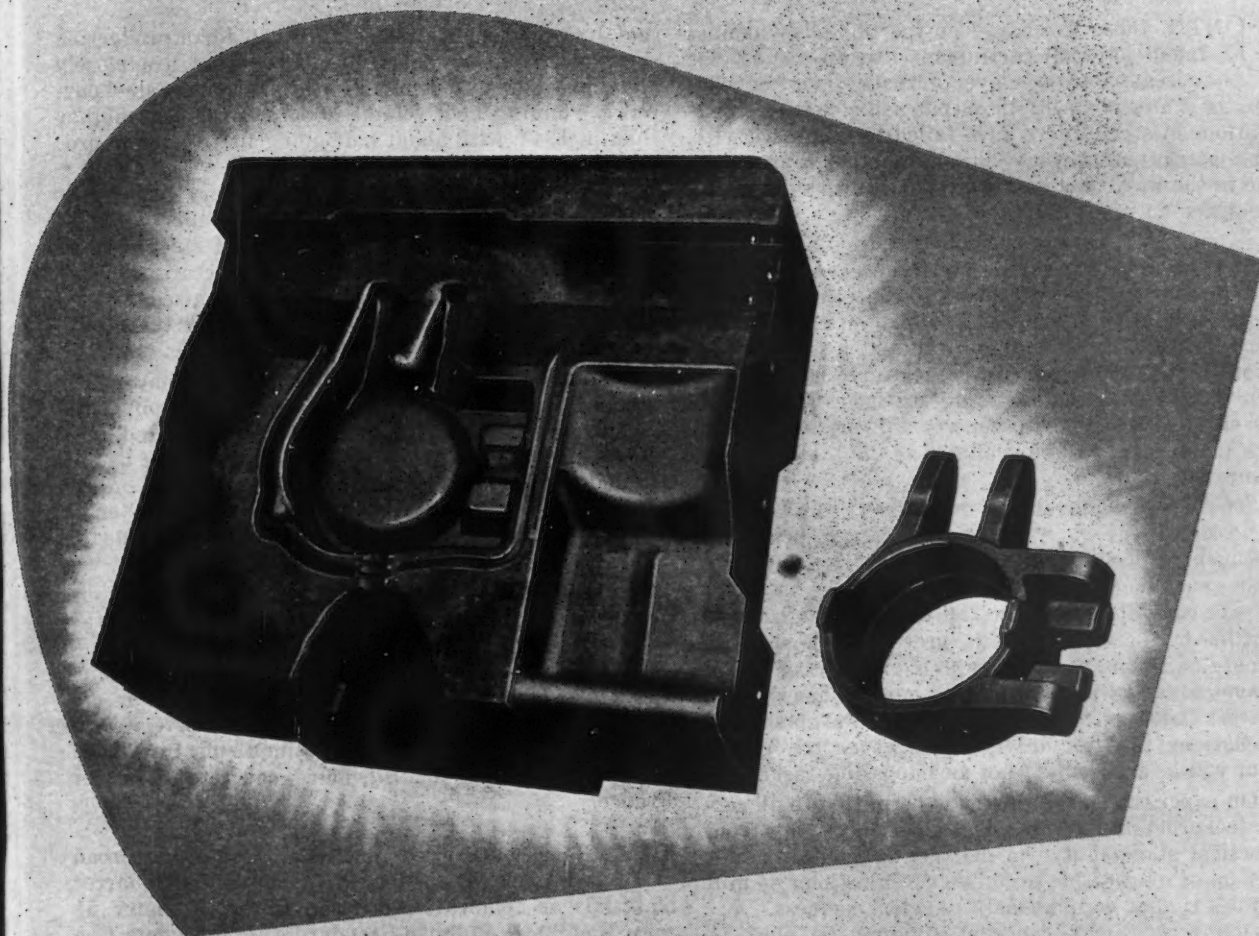
We shall appreciate your sending us the booklet containing seven articles on precision casting published during the past year.

COLLIER B. SPARGER,
Secretary & Treasurer
Coast Metals, Inc.,
2 W. 45th St., New York 19

● Reprints of all seven articles are available at 50c. per copy.

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This Industrial Week . .

- **Cancellations Increase but Space Still Tight**
- **WPB May Have to Take Drastic Action**
- **Steel Order Volume Far Below Peaks**

UNTIL those in charge of the big push against Japan have all their plans "ready to go," the current confusion over cutbacks and cancellations as it affects steel mill output will continue. Cancellations of steel orders have failed to keep pace with war contract cutbacks and although higher than at any time in the war, they have not opened up any appreciable space on mill order books.

Apparently puzzled by the failure of its order board to clear as rapidly as had been expected, WPB has followed its request to users to cancel unnecessary orders with spot inquiries as to which orders have not been cancelled. If its findings warrant, a full investigation of maximum inventory violations may follow. Even though such tactics might produce minor openings on steel schedules, prospects still are slight that much if any steel will be available in the third quarter on unrated orders.

There is little doubt that many steel orders now on the books will probably never be shipped because of subsequent cancellations. In the meantime, however, keeping such business on steel mill schedules has made the space unavailable for material which could definitely be utilized. This situation is preventing an orderly estimate as to the availability of civilian steel and it presages a period probably a few months hence when the steel industry may receive such an avalanche of cancellations that an orderly changeover to civilian output will be a difficult if not an impossible task.

On paper the steel industry is permitted to fill certain steel orders for civilian uses after July 1, but from a practical standpoint firm delivery schedules cannot be set up or even vague promises given as long as mill schedules cannot accommodate unrated business.

One reason why cancellations may be slow in reaching steel mills is the recent WPB permission for manufacturers of certain Class A products to retain and use ratings previously granted on an order which has been cancelled. However, it is necessary for such manufacturers to contact the WPB before such ratings are used for civilian output. The time lag in obtaining the proper permission and complying to WPB rules will further tend to prevent rapid cancellation at the steel mill level of a great number of orders. The amount of steel orders involved in such transactions will probably not be known for some time.

NET orders this past week were again the lightest so far this year. The volume in some instances ran as much as 65 per cent below peaks established earlier this year. Cancellations and adjustments in some cases amounted to half of the gross incoming order volume. Hardest hit have been alloy steel orders and decreased requirements for these types of steel are believed to be a factor in the Chicago District ingot rate decline to 95.5 per cent, the lowest in four years with the exception of strike periods.

Sheet steel cancellations are reaching the mill level

and June schedules at some mills call for a production drop of about 50 per cent. Producers are closely watching increased demand for high strength steel currently running at a volume about 50 per cent higher than in 1944, with about half going to direct war production.

The steel industry has benefited very little from personnel cutbacks at war plants. Common labor is still scarce. Furthermore, the ability of steel mills to produce those items for civilian manufacture, such as cold reduced sheets, tinplate and galvanized sheets, will be greatly determined by how rapidly the necessary skilled manpower can be made available.

Tinplate distribution in the midwest may again be hampered by lack of railroad cars because of grain shipments. Production may be adversely affected, producers state, by WPB Order M-43 limiting the use of tin in coating steel products to 100 per cent of the amount used in the corresponding calendar quarter of 1944. Tinplate deliveries currently are quoted for January, 1946.

Substantial cancellations, amounting to from 11,000 to 13,000 units, are expected on Treadway Bridge units for which contracts recently were awarded by the U. S. Engineers. The U. S. Engineer, Columbus, Ohio, is placing 13,000 tons of concrete bars, 70 per cent of which are reported to be for delivery west of the Mississippi. Lend-lease is inquiring for 26,000 tons of large size plain square concrete bars for France.

WPB has authorized construction of 407 railroad passenger cars using third and fourth quarter materials as follows: American Car & Foundry 51 cars, Budd 147, Pullman-Standard 197, St. Louis Car Co. 8, Pennsylvania Railroad 4. Permission has been granted to use stainless steel. Bids taken by the Army during the past fortnight calling for 1500 40-ton gondolas and 6750 20-ton box cars for fourth quarter construction are expected to nearly fill carbuilders schedules for the remainder of 1945.

Reports indicate that United Nations Relief and Rehabilitation Administration has ordered 115 locomotives to be delivered to Greece, Yugoslavia, Poland, Czechoslovakia, and Albania for fourth quarter delivery with 50 from Baldwin, 40 from American Locomotive and 25 from Lima Locomotive; for 1946 delivery the UNRRA has ordered 40 locomotives from Baldwin and 25 from Lima. United Kingdom manufacturers also will build 100 for the same purpose. Union Pacific has announced the placing of a joint order with the Chicago & Northwestern and Southern Pacific of \$2,500,000 worth of diesel electric passenger locomotives and an order by Union Pacific alone of \$2,000,000 worth of diesel electric switch engines.

The steel ingot rate this week declined one point to 91.5 per cent from last week's revised rate of 92.5 per cent.

• **TANK ARMOR CUTBACK**—Due to the cutback in military requirements for tank armor, about 400 of the 1700 employees of Carnegie-Illinois Steel Corp.'s, Farrell Works Ordnance plant will be released for other war jobs. There is a substantial need for manpower in the operation of the Farrell steel works and those released by the curtailment in tank armor production will be offered an opportunity to take such jobs as are available in the steel works. The Farrell Ordnance plant, converted in 1942 from an abandoned operating unit originally built in 1901 for the manufacture of sheet and tin plate products will be affected by the cutback in all of its departments and in most cases the plant will work two turns daily instead of the present three.

• **FREIGHT CARS BEHIND SCHEDULE**—Carbuilders are currently running about 4800 cars behind on domestic building schedules, and at the present time there are no domestic inquiries out for railroad cars. Despite the overwhelming need for cars by domestic roads, lack of manpower and the high rates of absenteeism in carbuilders' shops are raising havoc with car output. Meanwhile, however, there is a great deal of activities in carbuilding circles for railroad rolling stock for foreign countries.

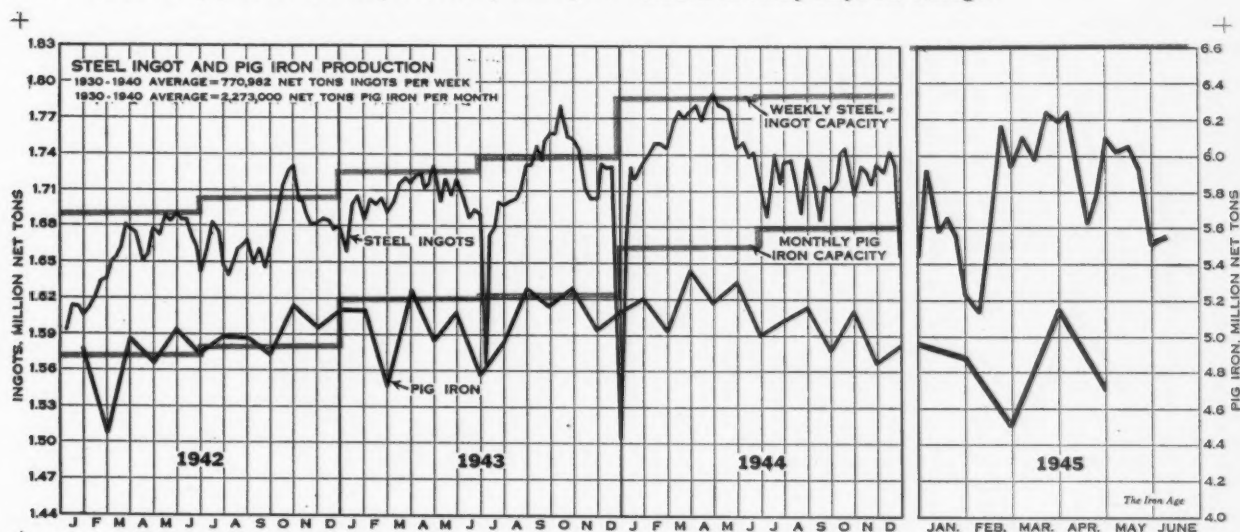
• **TRANSFER ARBITRABLE QUESTION**—Affirmation of a Regional War Labor Board order of Jan. 4, 1945, directing negotiations under contract grievance machinery on the issue of transfer of maintenance employees has been approved by the National War Labor Board in a dispute involving 400 workers at the South Works of Carnegie-Illinois Steel Corp. United Steel Workers of America, local 65 (CIO) represented the workers. The company had appealed contending that the issue did not pose an arbitrable question under its contract with the union.

• **COKE SUPPLIES LOW**—Production of both by-product and beehive coke in the United States as reported to the Bureau of Mines by coke-plant operators amounted to 5,601,242 net tons for the month of April 1945. This was a decrease of 575,058 tons when compared with the output in March. Stocks of by-product coke at producers' plants again

decreased and were 43,365 tons less on May 1 than on April 1, reducing stocks to the equivalent of 3.6 days' production. Stocks of bituminous coal at by-product plants decreased 995,838 tons during April and on May 1 were sufficient for 17.9 days' requirements at the rate of consumption prevailing in April, the smallest stock of coal in the by-product industry since July 1, 1939. One more by-product plant reported the use of anthracite, bringing the total to ten.

• **SCRAP SUPPLY DECLINES AGAIN**—Stocks of iron and steel scrap at plants of consumers, suppliers and producers continued to decline in March 1945, approximating 4,873,000 gross tons at the end of the month, representing a decrease of less than one per cent from the 4,901,000 tons reported February 28, according to a statement released by the Bureau of Mines, U. S. Department of the Interior. Consumers stocks on March 31 were 3,646,000 tons compared with 3,675,000 tons on February 28, while combined stocks of suppliers and producers were 1,227,000 tons and 1,226,000 tons on the same dates. A decrease of 29,000 tons in stocks of purchased scrap held by consumer, partially offset by an increase of 1000 tons in inventories held by suppliers and producers caused the net loss in the total supplies of scrap. In spite of the fact that consumers had increased their use of purchased scrap for March, suppliers were able to maintain shipments to satisfy this demand and at the same time to keep their stockpiles at the February level.

• **MORE CUTBACKS**—Manufacture of M-4 medium tanks at the Chrysler arsenal in Detroit has been ordered halted effective this month. The arsenal will continue to produce heavy M-26 Pershing tanks, but the cutback will eliminate 3500 of a work force of 5000. A second cutback developing in Detroit last week was one on aircraft instruments at Ternstedt Mfg. Division of G.M., already becoming effective. To be laid off will be approximately 1360 employees, mostly women. The layoffs will be gradual through July. Meanwhile, revised Pacific War requirements brought news that the Willow Run bomber plant, scheduled for closing in late July, will be completely stopped by the end of this month. About 1000 persons at the plant, meanwhile, are being assigned to a short-term project involving preparation of Army ships for storage.



Steel Ingot Production by Districts and Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
May 29.....	93.0*	97.5	83.0	95.0	94.0	106.5*	91.5	89.0*	94.5	78.0	103.0	75.0	69.0	92.5*
June 5.....	92.0	95.5	82.0	95.0	94.0	106.5	91.5	65.0	93.0	78.0	102.0	75.0	95.5	91.5

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Non-military Steel Allotments Up 3.6 Per Cent for Third Quarter

Washington

• • • Representing an increase of approximately 3.6 per cent, third quarter steel allotments for domestic non-military end uses were 330,000 net tons greater than similar allocations made for the first quarter of 1945, the last full quarter of the two-front war. But for most domestic programs, according to Lincoln Gordon, program vice-chairman and chairman of the WPB Requirements Committee, this does not represent any increase in steel over first quarter levels. He said it is hoped that the supply of carbon and alloy steel for the third quarter will continue at about the same levels as in the two previous quarters, 14,309,000 tons of carbon and 1,839,000 tons of alloy.

The easing of the supply situation was further reflected in Mr. Gordon's statement that in addition to the essential production allocations there will be approximately 500,000 tons of "free" steel available to industry during the third quarter—that is, steel that can be purchased on open market without priorities. Moreover, he added, it is also expected that the cutbacks in military procurements will make available to industry excess and surplus steel in substantial quantity, which will supplement the half million tons of third quarter "free" steel for the production of goods that WPB no longer restricts by limitation orders.

Increased steel supplies in the third quarter for essential civilian production were programmed for such items as farm machinery, cans, oil country goods, buses, trucks, railroad passenger cars, construction components, such as plumbing and heating equipment and builders' hardware. In the case of building components, Mr. Gordon pointed out the increases in allotments of steel to programs is designed to supply a steady supply of components that will assure increased employment in the construction industry in the near future when structural steel and lumber are more plentiful.

The only two civilian items not previously allotted steel, but which received guaranteed third quarter allotments, were refrigerators and washing machines. Programmed production of 350,000 washing machines and 265,000 refrigerators for the third quarter was authorized.

The program vice-chairman warned that, while steel from declining war programs is being released rather rapidly for civilian production, WPB will continue to enforce its inventory controls. These controls prohibit the purchase of "free" steel in advance of actual production need.

Small industries (those producing \$50,000 worth of items each quarter) will be aided in purchase of "free" steel by being allowed to place a AA-4 priority rating and a Z-3 allotment symbol on their purchase orders. This means that before any big purchasers can buy "free" steel, mills will have to place the rated orders placed by small manufacturers. Limitation inventory controls on all sizes of business and preference rating assistance for small business, during the transition from a two-front war economy to a one-front war economy, will hold the lid tight on speculation and assure equitable treatment for all strata of

industry, Mr. Gordon said.

Third quarter steel allotments as announced by the WPB reflect a big cut in Maritime quota. Allotted 921,000 net tons for the second quarter, the new Maritime allocation is for 288,000 tons.

Other agency allocations follow:

	Carbon (net tons)	Alloy (net tons)
War Department*	3,450,000	575,000
Navy	1,238,000	316,000
ODT	1,340,000	129,000
FEA	1,172,000†	43,000
Petroleum Administration for War	401,000	108,000
Maritime Commission . .	284,000	4,000
Office War Utilities . . .	130,000	26,000
Aircraft Resources Control Office*	80,000	200,000
Office Civilian Requirements	81,000	465
Canada	305,000	20,000
War Food Administration	161,000	17,000
Operations Vice-Chairman, WPB	3,600,000	455,000
Reserves	2,102,000	77,000
	15,243,000	1,971,000

*Subject to downward revision. Need estimated on basis of 2 front war.

†Rolled rails and other secondary products.

Cancellations Still Not Hitting Order Books Following Big Cutbacks

Pittsburgh

• • • One of the chief difficulties in mill scheduling and in production of steel today is in the cancellation of military programs where canceled orders do not reach the mill level quickly enough. Shell cutbacks of a few weeks ago are really only starting to hit the mills in any quantity, and the lag is a headache to the mills.

In this fact lies one of the greatest difficulties to plan intelligently any reconversion program. Ordnance in this area estimates the lag from prime contract cancellation until the mills have steel orders cancelled to be about 10 days. The facts are, however, that the lag is much greater, and mills are continually complaining about the matter.

While prime contract cancellations to date would not, even if they did get back to the mill quickly, leave too much room for civilian reconversion, the mills keep processing products until cancellations of orders are received. Despite the fact that there

has been much publicity given cancellations, a mill cannot stop work on a steel order until a definite cancellation is received. Consequently, work proceeds much farther than necessary when cancellations are not received.

Currently, for every cancellation the mills are getting, there are still many orders to be placed by Washington. Operators here indicate that as far as they can tell now, the demand for rated tonnages is still far in excess of cancellations. Thus, they are trying to satisfy civilian manufacturers with excuses when these manufacturers want steel and see evidences in the news that cancellations are very heavy.

A more prompt system of cancelling orders at basic materials levels, such as at the steel mill level, is very badly needed. Further, new production programs that are filling mill order books should be given some publicity, since, to all intents and purposes, cancellations have had, to date, very little or no favorable effect on steel deliveries.

Steel Price Advisory Group Condemns Recent OPA Price Changes

New York

• • • Bearing out recent predictions that the steel price increases announced May 23 by OPA would satisfy no one and that they would be a bone of contention for some time, the General Steel Products Industry Advisory Committee of the OPA recently condemned the adjustments as inadequate and inequitable. Furthermore, it is understood that the committee declared that compensatory price decreases now being considered by OPA would be unwarranted, unfair and contrary to law.

In its resolution covering the price question the company declared that profit margins directed by the Emergency Price Control Act were not maintained and that the increases failed even to cover total cost of production of the products involved. According to reliable information the committee condemned the increases as constituting an "arbitrary modification of the inadequate OPA product standard."

The committee stated that the adjustments were determined on the basis of an understatement of average manufacturing costs because no allowance was made for the estimated cost of the War Labor Board's directive for elimination of intra-plant inequities. It was also said that the

determination of the price increases was in "contravention of the statutory mandate that costs be computed in accordance with established accounting methods."

It is understood the committee declared that if cost data submitted by it for the purpose of establishing the necessity for increases in certain carbon steel products were used as a basis for price reductions, the OPA would be guilty of a breach of trust in diverting the data to this purpose. The committee declared that the earnings of the steel industry as a whole were unsatisfactory and that many

Labor Turnover More Than 50% Annually

Cleveland

• • • Labor turnover in Cleveland factories amounts to slightly more than 50 per cent of the average annual total employment, according to a survey covering payroll separations during February, March and April in 185 plants employing 99,559 workers, made by the Associated Industries of Cleveland.

In this three-month period, 12,893 employees quit their jobs, were dis-

charged, laid off or given leave of absence to enter the armed forces, aggregating 12.95 per cent of the average total employment. By far the largest portion of these workers quit.

Of the 12,893 workers who left their jobs, 9334 voluntarily quit, 2156 were discharged, 520 were laid off, and 929 entered the armed forces. Of an average male shop employment for the three months of 59,812 the total turnover was 7660 or 12.8 per cent, but among the 21,366 female shop workers, 3765 or 17.6 per cent were taken from payrolls.

Labor turnover is coming to be recognized as an important factor in manufacturing costs and some employers estimate that every turnover costs in the neighborhood of \$200 before the replacement became an effective employee. Cleveland's rate of turnover is now, however, as bad as the nation-wide average. The Bureau of Labor Statistics of the Department of Labor puts that average at 6.8 per cent for the month of March, compared with 4.46 per cent for the same month in the Cleveland area.

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Grants AA-2 Ratings On Maintenance, Repairs

Washington

• • • For reconversion, AA-2 ratings have been granted to the automobile, aircraft and domestic refrigerator industries to get maintenance, repair and operating supplies, in amendments to CMP Regulation 5, WPB said recently.

WRECKED SHERMAN: Marines gather to look at the damage inflicted on their General Sherman tank. With both treads gone, the tank rests on its top, completely overturned by a Jap land mine which it struck on Okinawa.



Blast Furnace and Foundry Declared Surplus and Offered for Sale

Cleveland

••• A blast furnace and a steel foundry, facilities of the Defense Plant Corp., and each a part of the \$700,000,000 government expenditure for new industrial construction in this district during the war, were recently declared surplus and are now for sale, according to an official of the DPC's Surplus War Property Division here.

Under lease to the Pittsburgh Steel Co., the blast furnace fully complemented except for pig casting equipment, is about 95 per cent completed and has never been used. Estimated capacity of the blast furnace is about 1000 tons, and there are eight buildings embodying 35,279 sq. feet of floor space.

Bounded by Pittsburgh Steel Co. property and the Monongahela river, at Monessen, Pa., the furnace is located on about six and one-half acres of land, and includes the following: A blower engine house with a 30-ton traveling crane—a cinder bay and cast house, served by a 15-ton and a 10-ton crane respectively, and a boiler house, which will contain three boilers. The DPC will own one-third interest in the superstructure and the foundations and the land is the property of the lessee. Five lesser buildings, consisting of a filter house, pump house, sanitary building, hoist house and a substation for precipitation are also included.

Designed and built adjacent to the American Rolling Mill Co.'s open hearth furnace, at Middletown, Ohio, the steel foundry has facilities for the production of heavy castings weighing up to 120 tons.

There is one building, containing 18,525 sq. ft. of floor area, a lean-to for wash and locker rooms, offices, and a pyrometer house. There is one 75-ton traveling crane, and two 1½-ton job cranes, and the building contains nine reinforced concrete casting pits 10 to 16-ft. deep, which take up 2400 sq. ft. of floor area.

This is an extension of the American Rolling Mill Co.'s building, constructed so that use could be made of the company's 225-ton cranes for handling the hot metal for casting purposes. The DPC owns no land, but there is a 15-year lease on the site, which covers .537 acres. Dependent upon outside source for light, water, and power, this facility can-

not operate independently of the American Rolling Mill Co.'s plant.

Machinery and equipment include:

Production equipment consisting of electric traveling crane, cokes and hold down, annealing furnace, transfer cars, core oven, swing grinders, job cranes, air compressor, sand

muller, sand unloading and screening equipment, sand conditioning equipment, mold driers, jarring machine and clamshell bucket.

Portable tools consisting of electric welder and air operated floor rammers.

Another DPC facility, at Massillon, Ohio, and operated by the Eaton Mfg. Co., was also declared surplus and put up for sale recently. Purchasers can take possession as soon as the mill is released from bullet core production.

Military Allotments May Be Used for "A" Civilian Production

Washington

••• Prospective manufacturers of Class A civilian products have been authorized by Direction 70 to CMP Regulation 1 to continue using military production allotments and ratings on civilian production after cancellation of military contracts. Action taken under this provision is an exception to the general policy of required prompt cancellation of orders when cutbacks are received.

A manufacturer who operates under this direction must notify the appropriate division of WPB within 10 days of advice of cutback, giving detailed information as to his intentions. WPB will then notify him of adjustments intended to apply to his

total allotments and total authorized production for civilian purposes.

This ruling applies to manufacturers operating under a CMP allotment whose initial letter is W, O, N, M, or C. This CMP allotment symbol may be used on civilian orders placed by the manufacturer, although it must be supplemented by the CMP symbol assigned by WPB.

Separate records must be kept of the use of the military allotment. An entirely separate account must be set up for this purpose, indicating the amount already used and outstanding orders at the time of cancellation, and separately the unused amount against which civilian orders are placed, or he may transfer the unused allotment to that received from WPB.

If additional material is required other than the civilian WPB allotment, application for the excess can be made on form CMP-4B.

STRATEGIC HANDLING: British troops manhandle a 25 pounder to keep it in balance as it is hauled up the steep Rangoon River bank in Burma.



April Contract Terminations Rise Sharply over Those in March

Washington

• • • Due entirely to those effected by the War Department, the sharp rise of contract terminations of \$1,800,000,000 initiated in April almost doubled March terminations and was two-and-one-half times the average terminations for the first quarter of 1945, it has been announced by Robert H. Hinckley, Director of Contract Settlement. Army Air Force terminations accounted for \$1,200,000,000, with almost 70 per cent cost-plus terminations.

Mr. Hinckley said that the new cancellations will not be reflected in an increased rate of settlement for a month or two more because preparation and filing of claims by contractors takes several months, and review and approval by the contracting agencies takes additional time. Settlement of canceled commitments in April, he said, showed practically no change from the \$1,400,000,000 average for the three previous months.

"Partial payments for prime and

subcontractors requesting them have been approved expeditiously," said Mr. Hinckley. "The amount of partial payments approved as of April 30 represents a substantial portion of the final payments which will be made for terminations awaiting settlement. The War and Navy Departments have approved partial payments of \$58,000,000 against the \$170,000,000 of fixed-price claims pending settlement on April 30. An additional \$27,000,000 was approved on terminations pending settlement on that date but on which claims had not yet been filed.

"Commitments for guaranteed loans at the end of April had made available \$3,641,900,000 for financing terminations in 2094 cases. On this amount, \$209,300,000 was limited to termination financing. The other \$3,421,600,000 was authorized under VT and 1944 V-loan programs which covered both war production and termination financing. Of the total of all approved guaranteed loans, only \$793,200,000 is in use. Just over a half million dollars is outstanding under T-loans."

Layoffs Continue In Ohio as Cutbacks And Cancellations Mount

Cleveland

• • • Layoffs throughout Ohio continued to mount as new cancellations and cutbacks were announced, and despite optimistic predictions that only about 3½ per cent of the state's 850,000 munitions workers would be affected within the next three months.

In the Youngstown area, layoffs at the General Fireproofing Co. have reached 1600 workers because of cancellations in Bell Aircraft Co. contracts, and at the Buick-Youngstown Co., which has been engaged in rebuilding half-track bodies, 200 of its 340 workers have been laid off. Sixty per cent of these are women.

At the Warren, Ohio, plant of the Mullins Mfg. Corp. a number of workers will be among the 1700 affected by cutbacks in munitions production within the next 60 days. Other Ohio companies affected include: Diebold, Inc., Canton; Bingham Stamping Co., Toledo; Moore Enameling & Mfg. Co., West Lafayette; W. A. Barrows,

porcelain enameling company, Cincinnati; and the Packard Electric Division, General Motors Corp., at Warren, which has already laid off a reported 100 workers. The American

Sintering Co. at Hubbard is reported ready to lay off 40 to 50 men, only eight men being kept on at the plant for maintenance work.

It is reported that the Warren Division of Youngstown Steel Tank Co., where tank tread blocks are made, has applied for exemption from the 48-hr. week work order, but no action on the application has yet been taken.

Recently, approximately 4400 workers have been laid off in Ohio as a result of war contract cutbacks since VE-Day, according to Ohio War Manpower Commission survey, and there were nearly 750 war plants throughout the state asking for workers to fill nearly 39,000 essential war jobs. John L. Craig, Ohio WMC director, said that the number of workers laid off was so small that it did not ease the manpower shortage.

Medium Tank Output To Halt June 30 At Pressed Steel Car

Chicago

• • • Production of medium tanks at the Armored Tank Division of Pressed Steel Car Co. will cease June 30, bringing cancellations at the plant during the past two weeks to \$172 million, the Army has announced. A fortnight ago announcement was made of reducing by 60 per cent the company's schedule for medium tanks and self-propelled guns. The recent termination canceled the

PLANT TRAINING, RUSSIA: Many inexperienced workers have been brought into war plants in Russia, and training departments, similar to this one in a ball bearing plant at Moscow, equip the new hands for skilled tasks.



remainder of medium tank production but did not affect self-propelled gun carriages, production of which will continue.

The contracts canceled represent 2775 medium tanks with spare parts which were scheduled to be produced through December, 1945. According to Pressed Steel officials, the tank termination will directly affect over 450 subcontractors and will result in the release of approximately 3100 workers by June 30.

In the fall of 1940, Pressed Steel signed a contract with the British to produce 500 General Grant medium tanks in the plant, the first tank being completed in July, 1941. Later the War Department took over British contracts and to date the company has produced more than 12,000 armored vehicles for the Allies, including both General Grant and General Sherman medium tanks, self-propelled gun and howitzer carriages and tank retrievers. The company also produced a large quantity of 155 mm. shells for the Army before its full production efforts were concentrated on armored vehicles. Ernest Murphy, Pressed Steel president, has been chairman of the Ordnance Department's tank integrating committee.

Workers released will be channeled to other war jobs in the Chicago area, according to the War Manpower Commission. The commission states that 409 top priority war plants in Chicago have a current need for more than 20,000 workers.

Heavy Shipbuilding Cuts Still Leave Steel Center in No. 2 Labor Group

Pittsburgh

• • • The labor situation in Pittsburgh shows a need of 6100 more male employees during the next 60 days, to fill important war jobs in the district, despite the layoffs at the district shipyards. With the last of 143 navy ships scheduled for delivery by mid-July the American Bridge Co.'s yard is nearing a close, and by the end of summer employment will have dropped from a wartime peak of 15,400 to 3000. Already, Dravo has cut its peak employment of about 14,600 down to about 2300, but these layoffs were disseminated over such a wide area that no major effect was felt.

Of the 6100 workers needed, about 50 per cent of the jobs to be filled are in the steel industry, with the greatest need in the McKeesport district. Aluminum and propeller plants, as well as the transportation industry, also need additional manpower. As a result of the needs, it has been recommended by Patrick T. Fagan, director of the War Manpower Commission of this area, that Pittsburgh remain in group 2 until July 1.

While the Army has cut back rather sharply on shell and tank production in the district, there have been no cutbacks in shells by the Navy, and both the Army and the Navy have recently boosted their de-

mands for rockets. Blaw Knox, at Martins Ferry, has been making 40-mm. guns for the Navy, and the demand has remained at contract level. The Army recently cut back on gun tubes and gun forgings at Mesta. Navy cutbacks have been few, except for ships at American Bridge and Dravo. On the other hand, Army cutbacks here on prime contracts have totaled, since May 1, about \$100,000,000, or about 25 per cent of the total prime contracts in the district. These cutbacks have run the breadth of the entire ordnance procurement program here, and were tapered cutbacks with runout periods of from 60 to 90 days. Furthermore about 50 per cent of the cutbacks were paper cutbacks, programs that were planned but not yet put into production.

The Navy's national procurement program in the first quarter of 1945 was set at about \$4,100,000,000, and for the fourth quarter at \$3,800,000,000. In the meantime, however, maintenance requirements and repair work steadily rose to the point that the manpower need for workers for ship repairs on the West Coast has become probably the most crucial need of the Navy. The damage done by suicide bombings on American shipping has been terrific, despite a heretofore tight censorship on such damage.

According to a local WPB official, there has been no resumption of spot authorizations to speak of in this area. Ordnance cutbacks have not yet been reflected at the mill level, despite the fact that the bulk of them were made between May 1 and 15. This reflects a very weak spot in the reconversion picture, since it is only by quick cancellations of mill orders that pile-ups of unusable semi-processed steel or other metals can be avoided. Further, only by quick mill cancellations can the way be opened up for resumption of civilian production.

The War Manpower Commission here expects no volume of unemployment during the reconversion period in this area. With steel on a 48-hour week, which is further evidence of manpower needs, it will take an additional 6000 workers to bring this main manpower-using industry back to a 40-hour week schedule.

SOVIET DENTAL CLINIC: Included in the medical facilities furnished for workers at the ball bearing plant in Moscow is a dental clinic. Special provisions are also made for mothers working in the plant, and for their children.



Canada's Plans Mature For Farm Tools, Autos, Electric Ranges, Ships

Toronto

• • • The Canadian government is rapidly removing restrictions and controls on iron, steel and other materials to speed up the swing from war to civilian production and to provide work for the thousands of employees that soon will be released from war plants and the armed forces. C. D. Howe, Minister of Munitions and Supply, in his election addresses throughout the country has stressed the point that no time will be lost in the change-over from war to peace production and that all persons released from the war effort are assured of employment. He pointed out that Canadian ship-building plants will be operating at virtual capacity over the next five years. Most of the ships now under construction, however, are for use in the Pacific war zone.

A new order increasing the production of new farm machinery and attachments for the next production year was announced by the Prices Board and all restrictions on the production of repair parts have been removed.

Rationing on items in short supply will be continued to ensure fair distribution, the board said.

Early in May the board announced production quotas would be maintained at about 100 per cent of the 1944-45 rate, but forecast that termination of war contracts and better supplies of raw materials might make additional supplies of farm machinery available. Present indications are for an output of about 130 per cent of 1944-45 production in the coming year.

Importers are free to sell under ration limitations whatever quantities of machinery and equipment their suppliers are allowed to ship to them under the terms of the United States' War Production Board.

The board's statement said that beginning July 1 all producers with total net sales, including exports and subsidiaries, of \$500,000 per year or more in 1941 must have their production schedules approved by the administrator of farm machinery, H. H. Bloom, and may not change these schedules without approval.

Neither producers nor importers may sell any machinery or equipment requiring rubber tires without the written approval of the administrator.

In the past, quotas have been split

between Eastern and Western Canada, but under the new order this feature has been eliminated. Each manufacturer and importer now is required to distribute to each Province in proportion to his average sales in each Province during 1940, 1941, and 1942, the board said.

The production quota controls imposed last year for the period ending June 30, 1945, have been cancelled. Scheduling of production by large producers begins July 1.

C. D. Howe has announced that authorization has been given to Canadian automobile manufacturers to produce 10,000 civilian motor cars this year and that the first cars will be rolling off the assembly lines before the snow falls this year. He also stated that automobile plants will operate at peak production throughout 1946. In this connection permits have been issued to General Motors of Canada Limited, Chrysler Corporation of Canada Ltd., and Ford Motor Car Co. of Canada Ltd., for the manufacture of cars this year. The Minister stated that there will be some changes in body lines, the new cars will be 1946 models, and in all likelihood the companies would find it expedient to concentrate on coaches and sedan models. Sufficient nickel and chrome will be available to put bright finishes on bumpers, trim and other parts. He also stated that the cars will go on the market, to essential users, at prices not higher than the cost in the 1941 basic period.

Controls over the production of electric stoves of all types have been revoked, Wartime Prices & Trade

Board officials announced. The present program calls for output of 17,500 units during the last nine months of 1945, however lack of labor and materials was handicapping production so that the removal of regulations is not expected to have any immediate effect on output. Controls over the production of electric ranges and grills were removed last October. Combination coal and electric ranges also are covered by the removal of these controls.

Mr. Howe said that regulations requiring prior approval of purchases of U. S. steel, copper and aluminum in mill, semi-processed and processed forms, have been rescinded. "The removal of these restrictions applies to all purchases for delivery after July 1, and prior approval of such purchases by the Priorities Officer, Steel Controller or Metals Controller is no longer mandatory," said Mr. Howe. "Manufacturers reconverting to civilian production will thus be able immediately to negotiate directly with their suppliers for requirements from the United States. This will be of interest principally to those manufacturers who are dependent on materials in forms or specifications not available in Canada." The Minister warned, however, that the rescinding of the regulations does not mean that these materials are in free supply. Some forms of steel in particular, will be difficult to obtain. "Priority assistance will still be available on purchase orders for materials for military programs, and also for many civilian requirements," said Mr. Howe.

Non-Integrated Steel Makers File Protest

Pittsburgh

• • • Formal protest for relief from the steel price schedules set up by the OPA ruling of May 22 will be made shortly by the Committee of Non-Integrated Steel Producers, representing the smaller steel companies which buy most of their raw materials from outside sources.

At a meeting recently the committee reaffirmed its conviction that the increases were wholly inadequate to meet serious losses which are now being suffered or are imminent for most steel companies and decided to intensify its efforts to obtain relief.

The committee also decided to prepare a brief to submit to the Senate Committee on Banking and Currency

leading to possible amendment of the law so that OPA would be required to consider all cost factors in determining the necessity of relief.

Membership of the committee has been increased to include: Lauson Stone, president of Follansbee Steel Corp., Pittsburgh; Robert W. Wolcott, president of Lukens Steel Co., Coatesville, Pa.; R. K. Clifford, vice-president of Continental Steel Corp., Kokomo, Ind.; David Thomson, president of Phoenix Iron Co., Phoenixville, Pa.; E. L. Parker, president of Columbia Steel & Shafting Co., Carnegie, Pa.; John Hosack, vice-president of the Mahoning Valley Steel Co., Niles, Ohio; D. V. Sawhill, president of Mercer Tube & Mfg. Co., Sharon, Pa.; and J. D. Streett, assistant to president, Granite City Steel Co., Granite City, Ill.

Shipbuilding Program To Close by Mid-July At U. S. Steel Plant

Ambridge, Pa.

• • • With the last of 143 Navy ships scheduled for delivery here by mid-July, the shipbuilding program at U. S. Steel's American Bridge Co. plant and Navy shipyard is nearing a close, and by the end of summer employment will have dropped from a wartime peak of 15,400 to 3000, the company announced recently.

Present employment is 8300, of whom 6600 are employees of American Bridge. The others work for four sub-contractors.

Area Director P. T. Fagan of the War Manpower Commission has announced that jobs are immediately open in the Pittsburgh district for all those made available for employment by completion of this phase of the Navy shipbuilding program and United States Employment Service representatives are on hand at the shipyard to expedite the channeling of released employees into other war plants.

It is anticipated that American Bridge will release 1300 workers for other war jobs during June and in somewhat larger numbers in months thereafter, following completion of the urgent ARV (LST-hulled aviation repair vessel) shipbuilding program.

The American Bridge shipbuilding program of 143 vessels has comprised 119 LST's, four ARV's, and 20 YF's (cargo lighters). Ten of the YF's are self-propelled and 10 are not.

The last LST was delivered to the Navy on March 28, the four ARV's will be completed early next month, and the last YF will be ready for service in mid-July.

Shows Increase For Bottleneck Products

Washington

• • • WPB recently reported that applications for bottleneck items of equipment and construction from preliminary reconversion, on which preference ratings have been authorized under Direction 2 to PR-24, and Direction 5 to Order L-41, during the period from April 1 through May 26, totaled 260 and had a dollar value of \$115,502,000.

The previous summary of applications, which covered the period from April 1 through May 19, issued May 26, listed 104 applications with a dollar value of \$107,983,000. As in the

previous report, the greatest number of applications (112) have come from the automotive industry, WPB said. These applications represented a value of \$105,843,000.

There were 34 applications in steel during the April 1-May 26 period, with a total value of \$2,258,000. In machinery, except electrical, there were 48 applications with a total value of \$4,505,000.

WLB Denies Union Request

Milwaukee

• • • A Regional War Labor Board directive of Jan. 22 denying the request of the Employees Independent Union for amendments to its existing contract with Kearney & Trecker Corp., has been affirmed by the National Board and a union appeal denied.

AUSSIE HAS LAST LOOK: An Australian soldier looks through a Japanese periscope on Yellow Beach Tarakan Island in East Borneo, shortly after the island was invaded.



Jahco Now Seeking Voluntary Quitting By Many Associates

Cleveland

• • • William S. (Bill) Jack, dynamic president of Jack & Heintz, Inc., one of the nation's most highly publicized war plants, became the center of a tempest in a teapot last week when one of his frequent extemporaneous speeches over a company public address system to Jahco associates was picked up by local newspapers.

In the quick series of strokes that ensued, Bill Jack was reported to have dramatically announced the company's first major layoff by asking for "voluntary resignations" by several hundred associates, and this alleged request was soon embellished to include some 4300 workers, more than half the number now employed by Jack & Heintz.

Company officials were quick to point out that the creation of jobs for returning servicemen, rather than a reduction in the labor force, was behind the move requesting resignations from Jahco associates who were not machinists before the war. Only about 50 employees have responded to the appeal, and according to Bill Jack, the company does not expect to receive resignations from more than 200.

Despite the series of cutbacks which has led to readjusted working schedules, and an effort to cut manpower, Jack & Heintz still holds more than \$90,000,000 in war contracts, and in addition, the company has received an order for a two-cycle engine to be used in conjunction with other equipment in B-29, B-32 and B-17 bombers.

Production of this engine will be started shortly, and the first engines are expected to leave the production lines in July, a reported two months ahead of schedule. Production of this engine will reach a peak of 1000 a month by the first of the year, with the possibility of being stepped up to 2000 a month thereafter.

With nine Jahco plants now in operation in this area, Bill Jack declared that present plans call for the full operation of all of them in the post-war period, with an employment goal of 10,000 workers, a number somewhat higher than the company's peak wartime employment of 8600. Jack & Heintz has done no hiring in the last eight months and are employing about 7600 workers at present.

U. S. Army Ordnance Completes Setup of French Ordnance Service

Washington

• • • U. S. Army Ordnance has completed the organization of a highly trained French Ordnance Service. This achievement was the forerunner of training now being given Chinese officers and men both in this country and overseas.

Two years before the invasion of Southern France, mechanized divisions, as known in the United States, did not exist in the Free French Army. There were two important reasons for this deficiency. The colonial armies of the French in North Africa were reminiscent of American Civil War troops insofar as equipment was concerned. They traveled on foot, usually with animal transport. This was the result of prevalent French military philosophy that any large-scale war would take place on the European continent where short lines of communication leading directly to French factories would be utilized as in World War I. As a consequence, ordnance field service was comparatively undeveloped by the French.

With the fall of France, the colonies offered the only hope of the Fighting French. Allied landings in North Africa materialized this hope.

But because of the primitive conditions of the Colonial Army, two years passed before it was sufficiently trained and equipped by U. S. Ordnance to take its place beside streamlined Allied Armies.

In addition to the huge problems presented by a foreign language and the strangeness of American material, Ordnance instructors were confronted with the absence of native technical specialists. One of the first steps was to establish service schools where American instructors taught French Ordnance personnel who, in turn, became cadre of new units. French units were completely equipped based on American tables of Organization, and depot companies were set up to receive, store and issue U. S. materiel upon its arrival in North Africa.

The first battle test came with the invasion of Elba. Supplies for this operation were extremely limited. Maintenance personnel worked under most difficult field conditions but with such skill and perseverance that at no time during the operation were there more than 40 vehicles deadlined in a 24-hr. period. Considering that the landing on Elba was amphibious, in some cases involving 5 ft.

of surf, this record is even more impressive. The French took the island in three days.

After the invasion of Elba, French troops were sent to Italy to prepare for the invasion of Southern France. In the summer of 1944, French Ordnance units in strength to support a field army on American standards were fully trained and ready for the landings. French Ordnance came ashore with the combat troops and materially assisted in the all-French liberation of the ports of Marseilles and Toulon.

Initially, French units were under operational control of the Ordnance officer of the U. S. Seventh Army, because of the necessity of centralized command. With the establishment of a joint French-American base section to service the armies which fought their way up from the south, the First French Army Ordnance became independent of American supervision.

Today French Ordnance officers and enlisted men are well acquainted with the American catalogue of ordnance items, with American methods of bookkeeping, stock recording, marking, shipping, transfer orders and requisitioning methods.

The French soldiers have high regard for the American equipment they have been issued. Even the Senegalese and Goumiers, noted for their dexterity with knives, received U. S. rifles with childlike glee.

The organization of a completely trained and smooth-running French Ordnance Service, which seemed practically impossible in the early days of 1943, has become a reality.

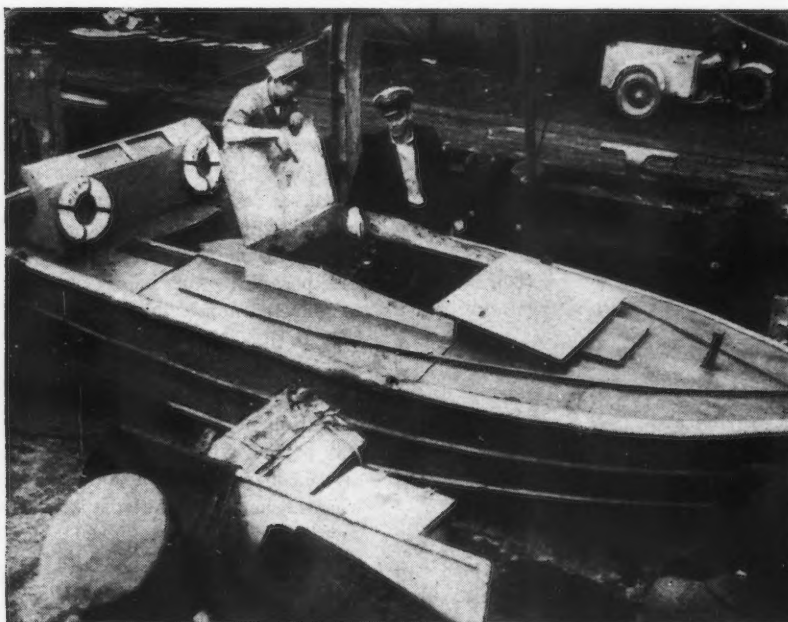
Job Opportunities For Workers Will Drop If The War Ends Early

Washington

• • • The early end of the Japanese War would not find the national economy prepared for the resumption of civilian production to an extent that would begin to supply sufficient opportunities for employment to keep our economic system working smoothly. This was a highlight of a report by the War Contracts Subcommittee of the Senate Military Affairs Committee submitted by Senator O'Mahoney, Democrat, Wyoming, on May 31.

Pointing out the uncertainty as to how the 15,000,000 to 18,000,000 workers now engaged in war production

SUICIDE BOAT: Souvenir of the destroyer *LAFLEY*, which was battered by suicide planes, is this Japanese one-man suicide speedboat, TNT laden, sunk at Okinawa.



will be re-employed after the defeat of Japan, the report states that of the 9,000,000 workers now in war plants only 3,000,000 will get in-plant civilian jobs, leaving 6,000,000 to be created by reconversion.

The Surplus Property Board which has been confronted with numerous delays and reported policy differences among its members is held up as exemplifying the need for continued close coordination by the Congress of the surplus property program so as to hasten reconversion and re-employment. The situation within SPB contributed to the recent resignation of former Senator Guy M. Gillette of Iowa from the chairmanship of the board.

DPC Ore Dock To Be Dismantled, Shipped To Ordnance Works

Cleveland

• • • The government-owned ore dock No. 1 at Escanaba, Mich., now nearing completion, is to be wrecked this summer and the salvaged lumber shipped to Ordnance plants and other federal projects in need of construction materials, it was learned here.

C. R. Clarke, manager of the Minneapolis regional office of the Defense Plant Corp., announced that the dock, completed except for railroad tracks and loading chutes, has been disposed of to the Central Procuring Agency, Washington, D. C.

Dismantling of the harbor structure will be performed under supervision of the U. S. Engineers, Milwaukee office, with a wrecking contract let to a private concern. It is reported that some weeks will be required to complete full arrangements.

Last winter it was announced that the dock, which was 75 per cent completed, would be offered for sale and the Chicago & Northwestern Railroad was considered a logical bidder, since it operates the port's two docks which are 45 and 20 years old. Original cost of the dock was approximately \$11,000,000.

During the winter of 1943-44, ore dock No. 3, also government-owned, and completed only to the extent of driving piling, was removed. Some 18,000 heavy timber pilings were sawed into lumber for an Ordnance project. The two docks were begun in the fall of 1942 to provide an emergency alternate route for loading ore into ships in case the locks at Sault Ste. Marie on the gateway to Lake Superior were disabled.

Concrete Bar Supplies Approach Normal as Directive Is Increased

Pittsburgh

• • • The concrete bar picture is clearing up a little bit and possibly by the end of June supplies may be back nearer to the normal needs. Billet mills rolling concrete bars will have a directive calling for somewhere in the neighborhood of 42,000 to 43,000 tons, an increase of nearly 40 per cent over the May directive. In January, when steel buying activity started on its way to an all-time high in March, concrete reinforcing bar manufacturers using new billets had a directive of 57,400 tons. From that time, the directive dropped to a low of 30,700 tons in April, as steel supplies became tighter. The February directive was 43,250 tons, while the March directive was 39,500 tons. The only answer in the present increase is that steel supplies are easing up somewhat.

While the directives fell during the first four months of the year, sales likewise took a decided slump. January sales totaled 78,000 tons; February, 43,000 tons; March, 45,000 tons; April, 38,000 tons, and the May sales are not yet known but are believed to be in the neighborhood of about 40,000 tons. While these sales figures exceed the directives, they include the sales of rail rerollers, whereas the directive figures do not. One interesting phase that has developed in recent

weeks, however, is the fact that rerollers have been unable to obtain rails, and are seeking aid from the billet rollers in meeting commitments.

However, the whole concrete reinforcing bar supply situation is easing. There has been some consideration given to removing the directive system for concrete bar production and permitting producers to pick up steel where they can. However, as the merchant bar orders are validated for months ahead, concrete reinforcing bar manufacturers are hoping that the directive system is not abandoned now. If the steel directive is removed on concrete bars, new billet rollers might find themselves without steel to roll.

Reference Book on Tanks

New York

• • • A complete history of the development of tanks and other armored military vehicles is provided in a new book by Lieut. Col. Robert J. Icks, edited by Phillip Andrews (Duell, Sloan & Pearce, Inc., New York, 264 pages, \$4.75).

The volume establishes itself as a reference book by covering elements of design and construction of tanks and armored vehicles of the world's military forces, and listing all known equipment by countries.

FACTORY CAVE: The Alfa-Romeo plant in Milan, Italy, which had been subjected to heavy Allied bomber attacks, was moved to the caves of Monte Berici at Costozza stretching for about 10 acres. The caves were fitted out with air conditioning apparatus and power, and employed approximately 1000 people in aircraft engine and munition construction.



Industrial Briefs . . .

• **NO REFUND** — Jessop Steel Co., Washington, Pa., received a clearance of renegotiation proceedings for 1944 from the War Contracts Price Adjustment Board, Washington, D. C., and no refund was due the government.

• **NEW QUARTERS** — Colonial Bushings, Inc., builder of Colonial drill jig bushings, has moved into new facilities at 21601 Hoover Road, Detroit.

• **ACQUIRES COMPANY** — Acquisition of the Williams Oil-O-Matic Heating Corp., Bloomington, Ill., by Eureka Vacuum Cleaner Co., has been approved by stockholders.

• **APPOINTED AGENT** — Calco Machinery Co., Philadelphia, has been made the exclusive agents for the Reed-Prentice line of vertical and toolroom universal milling machines in the Philadelphia territory.

• **KOEHRING EXPANDS** — The Koehring Co., Milwaukee, has purchased a four-acre tract north of its plant formerly owned by a coal company, to be used for plant expansion purposes.

• **ACQUISITION** — Mr. H. W. Wehe, president of the Overly Mfg. Co., Greensburg, Pa., has announced the acquisition by his company of the Kiromac Mfg. Co., of Richmond, Ind.

• **EXPORT COMPANY** — The Jessop Export Sales Corp., wholly owned subsidiary of the Jessop Steel Co., Washington, Pa., has been incorporated under the laws of Delaware to handle their export sales and also to act as importing agent. Robert A. Parks will be general manager of the export company. Temporary offices have been established in the Bessemer Building, Pittsburgh. Later the headquarters will be moved to New York.

• **APPOINTS REPRESENTATIVE** — Una Welding, Inc., Cleveland,

manufacturers of automatic arc welding equipment, have announced the location of E. O. Paullin, factory representative and welding engineer in Detroit. Mr. Paullin will have headquarters in the Statler Hotel.

• **NEW LABORATORY** — A new building for the General Electric Co.'s research laboratory, which will afford some 50 per cent more space than present facilities provide, will be erected near Schenectady, N. Y., at a cost of \$8,000,000, it was announced recently by President Charles E. Wilson. Construction will begin as soon as WPB approval can be obtained. The new building will vary from two to five stories in height and will include 200,000 sq. ft. of laboratory working space. One-third of the laboratory space will be devoted to service facilities, machine shops and specialty shops.

• **SHOPPING CENTER** — Plans for a \$1,000,000 shopping center in suburban Lackawanna have been announced by the Buffalo Gravel Corp.

• **PLANS EXPANSION** — Monsanto Chemical Co. has applied to the WLB for permission to build plant additions in Indian Orchard, Springfield, Mass., to cost, with equipment, \$3,000,000 to \$5,000,000. Company has developed new types of plastics which it plans to produce in volume in the new plants after the war.

• **NEW COMPANY** — Formation of Small Steel Castings, Inc., which will operate a foundry in Howard Street, Buffalo, has been announced by Joseph J. Cheney, president of the Spriesch Tool Co. He said the new concern is entirely separate from the tool firm. The foundry company has leased a building containing 20,000 sq. ft. and is installing about \$90,000 worth of equipment. Production is expected to start in about six weeks.

Metals Development Delaying Jet Power Progress During War

Swampscott, Mass.

• • • Development of the gas turbine jet engine for fighter planes has developed as far as possible using existing metals, according to R. E. G. Standerwick, General Electric engineer in charge of jet engine work for that company. He spoke on the occasion of the first national jet power gas turbine conference held here June 1 and 2.

Mr. Standerwick related that the idea of gas turbine power was an old one, but that its development awaited the interest of steel men in producing the required materials for high-speed operation at high temperatures. Perfection of newer materials still in their experimental stages will permit even more spectacular results with the gas turbine.

Gathering representatives of airframe and aircraft engine builders, jet engine manufacturers, and high ranking Army and Royal Air Force officers, the conference was held in secret to discuss the results of current research and to plan future aircraft development trends.

On hand was Brig. Gen. Lawrence C. Craigie, deputy chief of ATSC's engineering division, who disclosed that the possibilities of the jet powered plane are such that an entirely new concept of aircraft tactics must be developed before the planes are used effectively. He stated that one factor demanding new tactics is the comparatively short range of the new type planes.

Mr. Standerwick predicted a rosy future for the gas turbine, foreseeing its use for long range transport planes within the next two years, as well as its eventual use in automobiles. He confirmed that considerable research is underway on the use of new fuels, particularly solids, asserting that the present system was developed out of convenience to use kerosene, as it is readily available.

Little new information was disclosed at the conference on the present or future plans for the P-80 Shooting Star, powered by the GE "super-jet" engine, successor to the engines used in the earlier P-59A. No production was discussed, despite the recent announced "paper" cut-back on P-80 production involving at least one of the plants planned for jet plane production.

Kaiser Refinancing Request Unfolds His Postwar Plans

By CHARLES T. POST

San Francisco

• • • Tailoring of government policy in transferring war-born plants to peacetime use entered a new phase a fortnight ago when Henry J. Kaiser won the backing of 23 California Congressmen in asking a refinancing of the \$111 million RFC loan on his Fontana, Calif., steel plant.

The Congressmen state that RFC has been paid \$8,600,000 to date, an

Ed. Note: Material in this story is based upon a personal visit to the Kaiser steel plant as well as interviews with Kaiser officials by the author.

additional \$17 million is scheduled for repayment by Sept. 30, and \$8,700,000 has been paid in interest and \$40,000,000 exclusive of interest is scheduled for repayment. About \$95,500,000 from the loan was spent on wartime facilities.

Heretofore discussion has centered on sale or lease of plants actually owned by the Defense Plant Corp.,

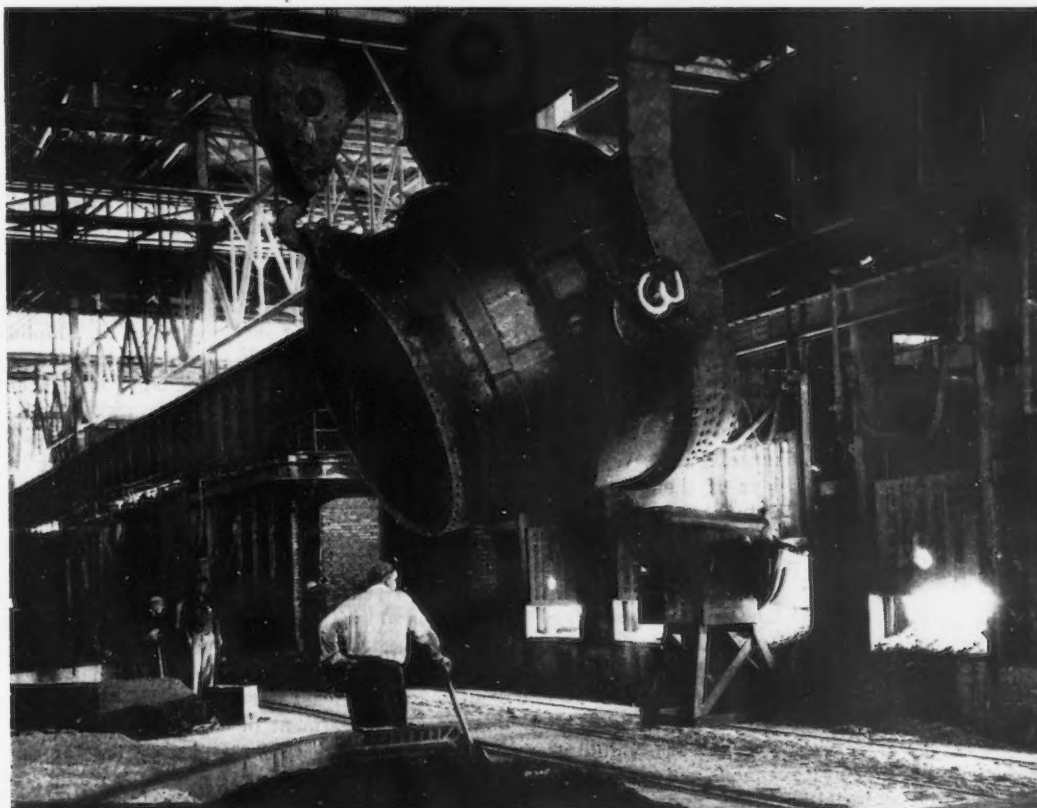
while Kaiser's case involves a privately-owned plant largely financed by a government loan. His case for refinancing the indebtedness is a strong one.

Possibly no other RFC borrower has had so little chance to shape its own business destiny as the Kaiser mill. The fact that the loan was made during the period of war emergency meant that Kaiser could do little more than sketch in the rough outlines of a steel mill to be built somewhere in the West. Location, steelmaking materials, equipment, and to a large extent products, were dictated by the war, and unless remedial action is taken the venture may emerge a competitive cripple through no fault of its own, other than being aware of the restrictions which inevitably would be placed upon it.

The plant's location at Fontana, some 60 miles inland from Los Angeles Harbor, is by no means ideal from the standpoint of peacetime

distribution, or even peacetime production, if cheap Pacific Coast scrap is to be heavily utilized. Although the Los Angeles area is held to represent more than 40 per cent of the West Coast steel market, cheap transportation—water transportation to a large degree—is important to reach the other markets necessary to keep the plant in profitable operating brackets. The rail haul to tidewater from Fontana means a handicap of the \$1.30 per ton freight rate on water shipments to the Pacific Northwest and for export. Fortunately northern California markets can be tapped by a \$4.40 per ton rate. When the plant was laid out, permission was reluctantly given by the Army to have it located near the coast at all, and Fontana was as close as it could come. One factor contributing to present operating costs is that of transporting coal from Utah and in small quantities from Oklahoma. Were the plant located on the coast, water transpor-

HOT METAL VS. SCRAP:
Hot metal open hearth charge may go by the boards after the war if abundant cheap scrap is available on the Coast.



tation conceivably could be arranged for coking coals originating as far away as Alaska at comparable cost to present sources.

Wartime construction costs were only part of the disadvantage arising from construction during the war period. Some of the facilities which had to be installed because of availability constitute equally as great a shackle on profitable long-term operations and will have to be written off, modified, or extended in order to bring the mill up to the accepted operating efficiency of its competitors. Metallurgically, the use of bottom-pour ingots adds considerably to operating difficulties and steelmaking costs, and bottom-pour practice would not have been acceptable had any alternative been offered at the time the mill was built. The original proposal called for installation of a blooming mill, essential to provide a degree of flexibility to the operation. Advised by WPB that this equipment would not be made available, the alternative of rolling from slab ingots was accepted. This meant that the size of the plate to be rolled determined the size of the ingot and required pouring up to 90 ingots per heat. While such a course could be justified under wartime conditions with some standardization of plate sizes scheduled, the wide variation in plate specifications in peacetime makes this practice highly impractical.

The present two stand plate mill will be incorporated into a continuous strip mill to be installed at Fontana if present plans are carried out. This means a much more expensive modification than at the Geneva plant which was blessed with an eight stand semi-continuous mill.

Without installation of additional finishing facilities now being engineered for Fontana to provide necessary product diversification, postwar conditions may dictate a still more radical revision of the basic mill setup—blowing out of the single 1200-ton blast furnace, and increased use of scrap in the open hearth charge. With scrap scarce in the early days of the war, and with fear prevalent in official quarters that the country's major pig iron production facilities might be disrupted through enemy attack or sabotage of raw material flow on the Lakes, blast furnace capacity was emphasized in all new units erected under the nationwide steel expansion program. Installation of 720,000 net tons of ingot capacity at Fontana in itself dictated a blast furnace and attendant raw material facilities, and

the case was clinched by anticipated full operations and the temporary scarcity of scrap on the West Coast.

Despite initial operating difficulties caused by uncertainties and variations in available raw materials both the coke ovens and blast furnace now appear well on the way to meeting costs considered generally acceptable in the industry. Friable Utah coal has been bolstered by the blending of approximately 12 per cent Oklahoma low volatile coal to produce a 58 per cent coke yield. Although the cost is under \$12.50 per ton, this coke has proved sufficiently strong to bring the single blast furnace close to its rated capacity of 1132 gross tons of pig iron per day, blowing 66,000 lb. of air. With improved operating techniques coming with experience, pig iron cost now is reliably understood to be below \$19.40 per ton, and the operators have hopes of bringing it down a dollar or two more. Without planned product diversification, pig iron output is not necessarily an integral part of postwar steel production at Fontana. Despite early statements by mill officials that the plant would purchase practically no scrap, availability of high grade scrap from West Coast shipyards and other sources at a net average overall cost of about \$11.00 per ton delivered has proved irresistible, and necessary at high operating rates. Current open hearth charges run in the neighborhood of 65 per cent scrap, 35 per cent hot metal.

Assuming that both the Fontana and Geneva plants operate in the postwar period, and conceding that considerable stiff competition will continue from eastern steel manufacturers, only the wildest boom could provide capacity operations for the western steel plants, or for that matter, steel plants throughout the country. If additional finishing capacity in other products is incapable of maintaining an operating rate of higher than 60 to 75 per cent, Fontana might be considerably better off by closing down its pig iron production, boosting its open hearth charge ratio to 80, 85, or even 90 per cent scrap—as is common practice at other West Coast steel plants—than by running the blast furnace on slack wind and saddling its hot metal with heavy fixed charges. To institute such an economy regime, it would be necessary to find some way of at least partially sloughing off the investment in mining properties, ore treatment facilities (Fontana has an ore bedding system and sintering plant), coke

ovens and by-products facilities, and the blast furnace itself. Probably this portion of the plant represents an investment of more than \$20 million spent on facilities essential for wartime operation, but of greatly reduced peacetime utility. Any estimate of the plant's worth without taking into account possible discontinuance of this portion of the operation is either looking at the future with rose colored glasses or dealing in purely physical evaluation.

From an operating standpoint such a fundamental modification of operating practice would require provision for a substitute for coke oven gas for the steelmaking and finishing departments, assurance of cheap scrap, and a source of pig iron at reasonable cost.

If a proposal to construct a pipeline carrying natural gas from west Texas to California materializes, the gas problem would be solved, for the proposed line goes right by the Kaiser plant. More important, fuel oil is readily and cheaply available in southern California which could be utilized as a substitute for coke oven gas as widely practiced in the industry.

Estimates of the amount of West Coast scrap which would be available to Kaiser at reasonable cost vary widely, but it must be remembered that present West Coast scrap consumers are no more anxious to have another bidder for available supplies than to have another steelmaking competitor.

If the far western postwar steel market is to be a third larger than prewar—and most estimates concede that it is—scrap supplies will be increased correspondingly. Unlike other sections of the country, the Pacific Coast scrap reservoir may be replenished to some extent during the war by scrap remaining from the windup of shipbuilding and industrial operations, even though large tonnages have been shipped East. In the prewar period, southern California was a scrap "plus" area. West Coast exports, almost entirely to Japan, were 332,993 tons in 1937; 357,151 tons in 1938; 436,577 tons in 1939; and 387,242 tons in 1940. The evaluation of this export scrap, about \$17 per ton, represents the absolute maximum paid for West Coast scrap in recent times, and much of this scrap was transported several hundred miles to ports of export.

On the basis of the author's prewar observations of the West Coast scrap market it would seem more likely that a level closer to \$13.50 per gross ton

for No. 1 heavy melting steel delivered to consumers would apply over the long term. It must be remembered that this possibility of a dominantly scrap open hearth charge is being considered only on the probability that the mill will operate at 75 per cent or less of capacity, charging from 10 to 20 per cent cold pig, and taking into account that about one-third of the scrap requirements will be met by home scrap.

Should the Fontana blast furnace be blown out, seemingly the most logi-

attuning the Kaiser operation to probable postwar markets. Much of the skepticism concerning postwar operation of the Fontana plant is based on the indictment that it is a high-cost operation. Under wartime conditions the plant chalked up an initial operating loss of \$2,300,000, but the operators claim that it now is in the black. Mute testimony as to cost is borne by the granting of special price ceilings on slabs, blooms, forging and rerolling billets, structurals and plates. Part of this extra

profit. For instance, it is highly improbable that Kaiser would have to sell structural shapes at 2.10c per lb. base which prevails at eastern basing points. Likewise, if far western consumer agitation is successful it is improbable that the present Pacific Coast base of 2.75c per lb. will prevail. The target, as nearly as can be computed on the basis of scant information on actual cost of water transportation through the Panama Canal, probably would not be lower than 2.40 or 2.50c per lb., which represents

PLATE HANDICAP:

Lack of a blooming mill makes it necessary to roll plates direct from slab ingots shown being teemed here.



cal source of the relatively small amount of pig iron required would be Geneva. The original Geneva announcement by the government contemplated that it would supply iron to enlarged Bethlehem steelmaking facilities on the Coast, and such an arrangement with Fontana following the war would be no less feasible. Postwar capacity operation of Geneva seems improbable thus making available pig iron which would not otherwise be used. An alternative source would be shipment from the East via the Panama Canal. In the past some Indian foundry iron has come to the Coast.

Consider now what is involved in

cost arises from abnormally high cost of constructing a plant in record time under wartime conditions and high interest charges are currently one of the largest factors. Beyond that, the current extra cost is due to such factors as have been previously discussed—high pig iron cost, bottom-pour ingots, lack of blooming mill, inflexible plate facilities. All of these problems could be remedied under normal operating conditions.

Contrary to popular belief, high cost is not necessarily the determining factor in a profitable operation. The acid test is whether the producer can reach his market as cheap or cheaper than his competitor and still make a

eastern base plus water freight at cost. This would require a considerable trimming down from the current special ceiling of 3.20c per lb. f.o.b. Los Angeles but it emphatically does not mean that eastern operating costs must be met.

Kaiser's own estimates of postwar western steel consumption probably are as good as any in determining market possibilities for the Fontana mill. The Fontana plate capacity is 300,000 tons, compared to a total estimated western market of 224,200 tons. Prewar, the fabricated plate market was dominated by three classifications: Large diameter pipe, in heavy demand for municipal water

projects; penstocks, discharge pipe, and other fabricated accessories arising from power and irrigation projects; and storage tanks, sold in large numbers to the petroleum industry. A considerable tonnage went to export. Kaiser estimates that 80 per cent of the postwar plate market lies in California and a portion of the balance in Arizona and New Mexico. Conceding stiff competition from the East and

225,000 tons of plate capacity as an outlet for raw steel.

On May 24, A. J. Gock, chairman of the board of the Bank of America said that his bank and others would advance \$60,000,000 if satisfactory arrangements could be made with RFC to put the plant in a position to produce hot rolled sheets, tin plate, and other tubular products. This would include a continuous sheet and

experienced prewar and probably is based upon the theory that additional population in the West will justify increased manufacturing there by the big sheet consuming industries, such as automotive and appliance. To avoid becoming mired in a morass of intangibles it will suffice to point out that Geneva, too, envisions entering this field, and that with East Coast water borne competition the scramble for available tonnage will be a mad one. Here again, Kaiser can count on no more than a third of the available tonnage.

This brings us to the profit studded diadem of the Coast market, tin plate. The Kaiser market estimate of 438,900 tons for the Coast varies only a smidgin from those of other sources. From a commercial standpoint, the implications of Kaiser's entrance into this field in the West, which consumes, with Alaska and Hawaii, about a third of all the tin plate used by the canning industry, would be large. Projected operation of the Geneva plant envisions a tin mill either at Geneva or at some coast site, probably the former. If U. S. Steel Corp. is successful in acquiring the Geneva facilities, repercussions of the battle for western tin plate business could easily echo throughout the country. Since it is estimated that about 90 per cent of the tin plate sold on the West Coast before the war by U. S. Steel was produced at the modern Birmingham mill built about 1937, a geographical shift in production centers could well ensue to boot.

Some idea of the competitive aspects of the situation may be gained by reading the sections of the Temporary National Economic Committee hearings bearing on tin plate (See Temporary National Economic Committee, Congress of the United States, 76th Congress, parts 19 and 20.) These hearings alone, without other evidence, indicate that long term purchase agreements by the can companies may subordinate the relative locations of the mills as the prime factor of importance in capturing the market. Quite possibly Kaiser has examined the testimony of Ernest T. Weir, chairman, National Steel Corp., before the TNEC in which is indicated a successful departure from usual pricing policies in the field, and it would not be surprising if Kaiser should turn up with some of the same customers on the Coast who heavily patronize National Steel in the East.

The total western postwar annual tubular market is estimated by Kaiser at 490,000 tons, a conservative figure.



USEFUL CAPACITY: Excess structural capacity could be used to produce piercing billets for a seamless tube mill if Kaiser decides to go in the pipe business.

Geneva even in southern California, the total probable Kaiser share of the plate market can optimistically be estimated at 100,000 tons or less. That, in itself, is a good argument for a severe markdown on the portion of the RFC loan allotted to the plate mill construction. That means that some way must be found to replace

strip mill installed with cold reduction and tin mill departments.

Kaiser estimates the postwar Coast market for hot rolled sheets and strip at 215,200 tons and cold rolled at 228,100 tons. Tin plate consumption he sets at 438,900 tons.

This estimate for sheet and strip is much higher than the actual market

As with plates, the more than 200,000 ton capacity of the Fontana structural mill, is somewhat out of line with future market possibilities although not to the same degree. Therefore, some incentive towards entering the seamless tubing market is offered by the possibility of rolling piercing rounds on the structural mill. A second incentive lies in the almost total occurrence of the West Coast oil country market in southern California in which the Kaiser mill is located. Possibly these two factors will serve to overcome natural reluctance to enter the seamless field engendered by unprofitable early operating experiences by other newcomers.

The future of the Kaiser merchant mill, which has an annual capacity of more than 200,000 tons, according to the company, is the brightest of any unit in the plant. Modern in design, its efficiency probably competes with any other unit in the country.

The dominating argument against making the Kaiser mill inoperative, aside from sectional and defense considerations, which have been aired at length in political circles, is that it is a modern steelmaking plant which is rapidly being placed in a competitive position. To place the plant on the same basis as competitors, however, it will be necessary to (1) reduce fixed charges to compare with—but

not undercut—those carried by other operations of comparable modernity and product range; (2) eliminate uneconomical operating practices made necessary by the war; (3) partially write off sections of the plant of dominant wartime utility, including probably pig iron, mining and coke facilities, the plate mill, and to some degree, the structural mill; (4) construct new finishing facilities to place the mill's product mix in balance with market possibilities. Whether Kaiser will succeed in convincing the RFC of the advisability of this course remains to be seen, but if he doesn't, there is a good probability that some other operator will stand by to pick up the torch.

Westinghouse Cutback In Marine Propulsion Electronics, Aircraft Pittsburgh

• • • A moderate increase in cutbacks of war contracts at the Westinghouse Electric Corp. already reflects in part the tapering off of military requirements, A. W. Robertson, chairman, disclosed in New York recently.

Mr. Robertson reported at a meeting of the board of directors that the backlog of unfilled orders at the end of April amounted to \$591,633,898. In the first two weeks of May, 235 of the company's war contracts amounting to \$11 million were terminated. Operations most affected by these terminations include the production of radio and electronic apparatus, propulsion equipment for ships and material for aircraft and tanks.

Since V-E Day there has been a liberalization of production approvals by WPB for the manufacture of such heavy electric power equipment as steam turbines, switchgear and power transformers for civilian use. Plans for reconverting the appliance manufacturing plants to civilian goods production have been completed, and it was estimated that production of refrigerators could get under way within four to five months after authorization is received. Manufacture of electric irons will begin first since they require the least delay and shortest retraining program.

Also within two to three months after authorization, it is estimated, some models of radio receivers will be leaving the production lines of the newly formed Home Radio Division at Sunbury, Pa.

Mr. Robertson said he thought production of consumer goods would be authorized quickly by the Government, but he anticipates that certain critical materials will be a bottleneck. He cited the still heavy war demand for steel, tin, rubber, lumber and paper.

Ala. Ordnance Depot Reverts to War Dept.

Washington

• • • With the expiration on Aug. 30 of the Chrysler Corp.'s contract, management of the Anniston, Ala., ordnance depot will revert to the Army, the War Department has announced.

Praise of the Chrysler management the past two years was given by Lieut. Gen. Levin H. Campbell, Jr., Chief of Ordnance.

"The entire organization," said General Campbell, "has shown a great capacity to make things work in spite of changing conditions and many handicaps. There has been hardly a major battle during the last two years which has not been supplied, to some extent at least, with ammunition and vehicles from this depot."

He pointed out that the increased activity at the depot, arising from the growing war demands on its facilities, combined with efficient equipment and organization, have resulted in increasing the output per day per man, from 1.36 to 3.85 tons. Under the Chrysler management, the General said, more than 1,230,000 tons or 35,600 carloads of materials and equipment have been handled at the depot and more than 448,000 line items have been shipped. In addition, he stated, the depot has

overhauled 825 tanks, scout cars and armored vehicles and 970 pieces of artillery ranging from 40-mm. guns to 155-mm. howitzers.

"Recently a reclamation project has been instituted," General Campbell said, "which is handling more than 70 tons of materials and equipment received from the battlefields and training camps every day."

The Anniston Ordnance Depot covers approximately 24 sq. miles and has 150 buildings on the property in addition to 702 igloos, or underground ammunition storage buildings. Normally 5000 employees are engaged at the depot.

WPB Relaxes Rules On Consumer Utilities

Washington

• • • The WPB Office of War Utilities has issued Direction 5 to utilities order U-1, authorizing contractors building consumer-owned utility service extensions to use the CMP allotment symbol and the priority ratings assigned to U-1 for the same type of construction.

The order assigns a CMP allotment and normally an AA-3 rating to utilities for constructing distribution line extensions. Direction 5 stipulates that where such extensions are built by the consumer for connection to utility lines, contractors may obtain necessary materials in the same manner as utilities. The direction requires that the private construction be utility-approved before materials purchase orders are rated by the contractor. The direction does not provide assistance to contractors in obtaining material for wiring plumbing inside a consumer's building.

Shipping Needs for Pacific Staggering

A 21,000 mile trip through the Central and Western Pacific war areas indelibly impresses upon one's mind the fact that the Pacific war is not only a shooting war, but also a war of vast distances over which supplies must be transported from the United States to carry the fight against the homeland of Japan.

Covering this distance in a total of 103 flying hours in no way minimized the expanses of water, which require three to four months for freight ships to traverse before the farthest reaches of the Pacific can be sighted.

With supply activities now centered in the Central and Western Pacific, areas which once made headlines, such as Guadalcanal and New Caledonia, are now relatively free from the dangers of war. Islands which were taken by American forces in the early stages of our comeback in the Pacific are now nothing more than "Ghost islands." Supplies and equipment, as well as men have been moved from these islands to places where they are again being used against the Japs.

Concerning ourselves with the supply problems of the Navy, and their

By EUGENE J. HARDY

o o o

possible effect on American business our actual trip began with a tour of the Oakland Naval Supply Depot at Oakland, Calif.

Ed. Note: This article was written by one of THE IRON AGE editors who has recently returned from a 21,000 mile tour with Navy Department officials to the Pacific theater of war. The story is material picked up on the spot.

This wartime installation is responsible for supplying the Pacific fleet and shore bases with practically all supplies, except large caliber ammunition and medical supplies. More than 80 per cent of all aviation supplies heading for the Pacific pass through this depot.

At Pearl Harbor we learned that the supply problem in the Pacific is now one-third greater per man than on Dec. 7, 1941. At the present time approximately 2000 lb. of supplies are

required to keep one man in operation, as compared with the original 1400 lb. estimate. The distance factor as American forces moved away from the United States is responsible for this increase. Storage space at Pearl Harbor is now measured in acres rather than square feet.

At Pearl Harbor, as throughout the 14th Naval District, all work goes on around-the-clock, seven days a week. The realization that there is still a tough war to be fought in the Pacific was brought home by the remark of a young Navy officer, who, looking at the headlines the morning after V-E Day said: "Well, I suppose the war in Europe was won so the touts back home can have horse racing again."

Every day, as our Fleet moves further west, its supply needs are met by the vast facilities established here, one more link in the supply line beginning back at Oakland and other depots on the West Coast.

The newest facility in this area is the Naval Air Station Honolulu. Here the Naval Air Transport Service operates to all points in the Pacific, transporting mail to our fighting men, urgently needed supplies to distant ships and stations, and evacuating wounded.

As the Battle of Midway was the turning point at the high tide of Japanese supremacy in the Pacific Ocean Area, so was the mounting and staging supply work preparatory to the capture of the Marianas Islands the utmost in direct logistic support of our Fleet from its major base in the Hawaiian Islands.

The character of Oahu's logistic support of the Pacific Fleet has undergone change, for operations are no longer being staged directly from Pearl Harbor. The war has moved further away.

The task which faces the Hawaiian Islands now forecasts in some degree what will happen to these islands when final victory is won. Instead of full direct loading into the combat fleet vessels, naval supply personnel here are loading, diverting and assisting support shipping in maintaining the more forward bases as well as "topping off" the various fleet types of ships. Hawaii is a huge central depot of supplies at the hub of the Pacific and even though the United States may retain bases in the far reaches of the Pacific after the war is won Pearl Harbor and its supplementary activities will always have an

CARRIER PLANES HIT MILLS: This closeup shot was made by American airmen of the Mitsubishi steel works at Kobe, Japan, in March, showing wreckage wrought by Navy planes. Note bomb splashes around ships in the harbor.



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emergency status in the vast supply job required to maintain the fleet.

Kwajalein was the next stop in our month-long junket. This coral atoll is still practically bare of vegetation, the palms having been blasted away before our troops landed. The most important item we picked up here concerned the effect of these tiny coral islands on practically all metal goods. The air strips here are made of coral and to keep the strips in good condition the coral must be kept alive. This is done by constant sprinkling with salt water. The combination of salt water and coral plays havoc with steel, aluminum and other metals. Corrosion is so great that airmen stationed here say that if a plane is used in this area that should be its last tour of duty, for nothing but complete rebuilding will put it back in operating condition. In 30 days copper tubing is corroded about $\frac{1}{8}$ in. thick.

Sighting Guam we began to realize what American ingenuity and workmanship can accomplish. Our forces, led by the Seabees, have transformed it into a modern island. There are now about 200 miles of paved roads on Guam. About 45 miles of this road system is four-lane modern highway. Machine shops, foundries, electrical shops and others are now busily operating on filled-in land which was once part of the Pacific. Industry has literally been moved to the Pacific.

The Japs built one air strip, which was crude and practically worthless.

Our forces now have dozens of strips capable of handling all types of planes. Harbor development is also extensive. Air groups here are keeping 70 per cent more planes in the air than existing maintenance facilities were supposed to be able to handle. Native towns are being rebuilt, most of them on new sites. Practically all towns and villages were leveled by American shellfire, for the Japs merely ran the natives out of their homes and moved in, not bothering to build their own quarters. The island is now dotted with thousands of quonset huts.

A real insight into logistics was provided for us on Guam, for this island has been the center of planning for the most recent operations against Japan and will probably remain so until larger land masses are secured.

Logistics planning always required fairly accurate forecasts of what will be needed in the months ahead and in the Pacific this is particularly true, since in the Western Pacific a requisition is generally not filled for at least four months after it is filed. Ammunition requirements are the hardest to anticipate in the Pacific. The fast movement of our troops gives the logistics people many headaches in the determination of the amount of ammunition that will be needed for a particular operation. Tonnages that are needed at the present time are twice the original estimates.

For example, B-29's that were originally supposed to carry a four ton bomb load now are able to carry 10-

plus tons. These planes are now 85 per cent operational rather than the 70 per cent that was originally felt to be the maximum and are now flying five missions in 10 days rather than seven missions per month.

In the Central Pacific ammunition requirements during the Okinawa operation were about 175,000 tons for the Navy and 166,000 tons for the ground forces, as compared with a monthly average for the Navy of 38,500 tons and 9600 tons for the ground forces.

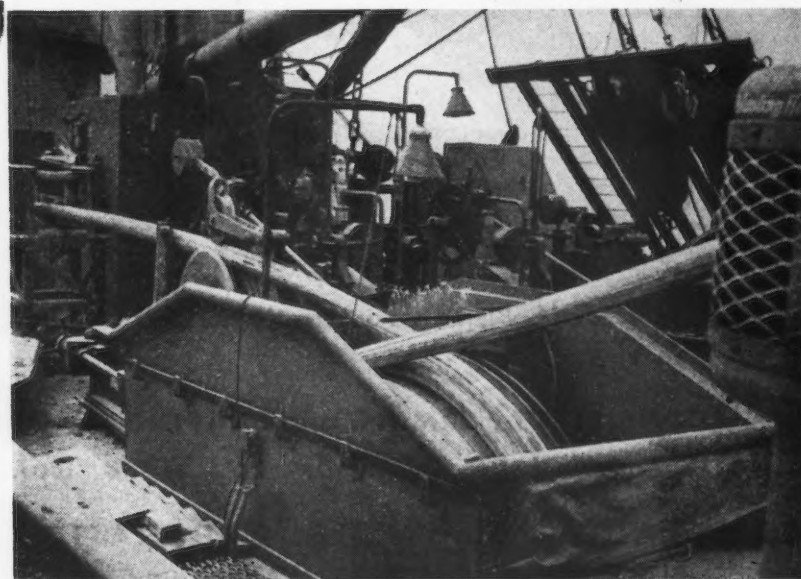
Supplies will have to flow to the Pacific in increased quantities, despite the ending of the war in Europe, for the fact that the European theater had top priority on both supplies and shipping has been the only bottleneck holding up an even faster military movement in the Pacific. Every commander we contacted considered shipping his number one problem.

Construction will continue at a rapid pace in all of the territory occupied by American forces. If the war against Japan continues for any length of time conservative quarters say that about four times more shipping will be required than is now available. As the war moves on supplies will be moved directly from the United States and Pearl Harbor, which will remove the necessity for trans-shipment and using larger land masses for supply bases; this is the primary reason for the emphasis laid on keeping up production and keeping the pipelines filled.

The rapid movement of our forces continues to run ahead of available shipping and stockpiles in the Pacific ocean areas. There is nothing but the highest praise for the quality of American equipment and questions regarding the alleged superiority of certain Japanese items generally brought little more than contemptuous sneers. The only other gripe coming from people concerned with logistics was concerned with the constant design changes in the United States which slow down production. There was a very definite feeling that changes in design should not be allowed to interfere with maximum output, unless these changes are absolutely necessary to furthering victory.

Logistics planning covers the needs of the civilian population in the areas our forces plan to occupy, which greatly increases the supply problem. Supply problems will also be magnified when the Army moves into the Pacific in force. At the present time only airforce units and special service

OPERATION PLUTO: 20 undersea pipelines across the English Channel were another part of the European invasion operation just now being brought to light. The 3 in. lines are of all-welded construction, some of them crossing 70 miles under the channel.



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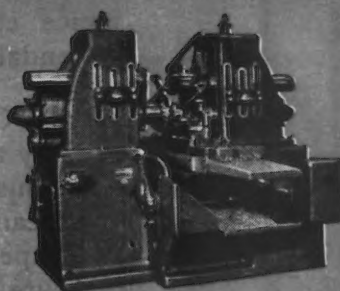


The straddle milling operation on this 1236 Milwaukee Duplex Milling Machine requires flexibility in spindle positioning because the milling cuts are at different levels. . . . Independent spindle speeds are necessary because the job required the use of two diameters of cutters. . . . "Anchoring" the spindle quill with the quill support mounted on the overarms, insures vibration-free operation in either "out" or "in" position.

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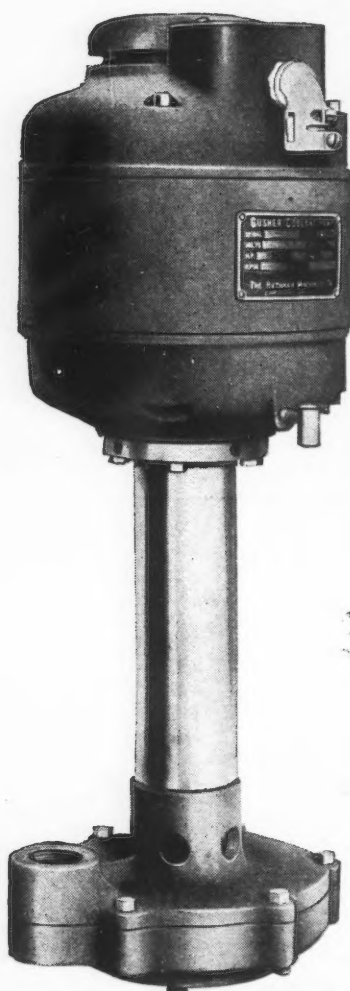
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troops have reached the Pacific from Europe. This order will be followed quite closely, that is, after air units, engineers, ordnance men, signal corps and other segments of Army Service Forces will be shipped west long before actual combat troops begin to move. The B-29's when fully deployed in relation to air force units coming from Europe will drop more tonnage on Japan than was dropped on Hitler's Europe and this bombing will be more effective because of the smaller land masses involved.

The Naval Supply Depot at Guam is much like other activities of this sort, except that its requirements must be estimated months ahead since it is the largest supply depot ashore in the forward areas. It is up to this depot to give the Pacific Fleet all types of consumables, all types of fuel, radio and radio spares, ordnance and ordnance spares, and spare parts for engines and hulls.

Depot operation is complicated by the fact that in addition to taking three months from the time that a requisition is submitted till the materials arrive, there was no past record of previous years to guide inventory policies. The depot has been operating only a few months and already its turnover on a yearly basis is double the original \$800,000,000 estimate. The demand on this depot fluctuates with the activity of the Fleet in its current operation with the damage sustained.

After leaving Guam we journeyed to Saipan, Iwo Jima and the Carolines. In all these places practically all the fleet repair and supply functions were afloat. These activities are under Service Force, Pacific Fleet, which is exactly what the name implies. Squadron Ten which is under Service Force, operates the world's largest floating supply and repair base. From this main base a network of subsidiary mobile bases operate at the farthest advanced anchorages. Thus, it serves as the last jumping off place for fighting ships of the Fleet before making their thrusts into Japanese waters. The number of ships and of Squadron Ten run into the hundreds and the men into the thousands.

Under the command of Commodore W. R. Carter, USN, this "Floating base" is referred to by Fleet Admiral Chester Nimitz as his "secret weapon" which upset all Japanese planning by permitting the American fleet to make strikes thousands of miles from shore bases without being required to return even for refueling.

The idea of the mobile base is not

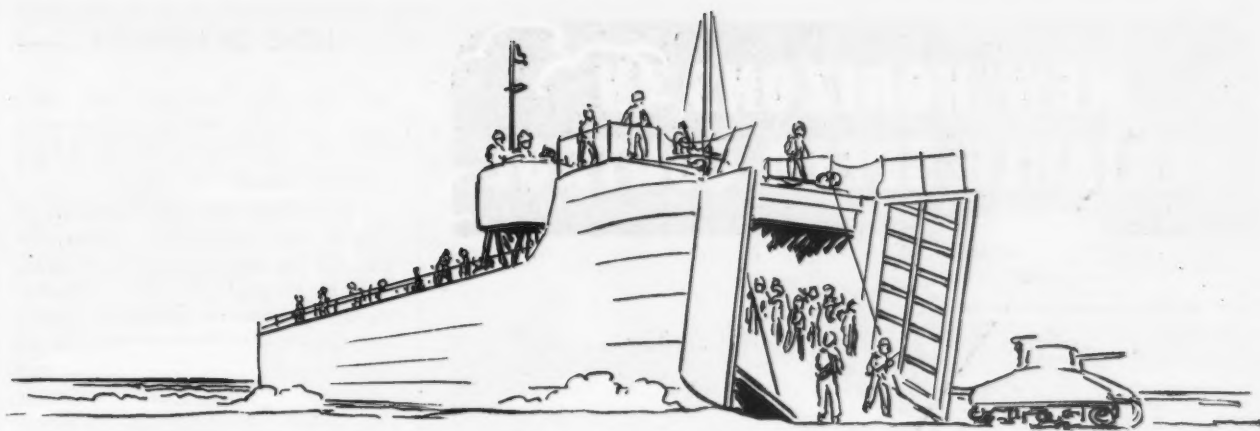
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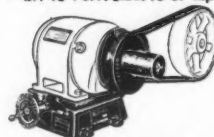
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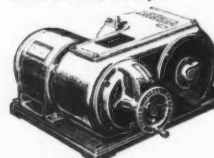
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## NEWS OF INDUSTRY

new, but dates back to 1920. However, the experiments carried on at this time never went beyond the preliminary stages.

"Soon after this war started," according to Commodore Carter, "we realized the Japanese were not going to fight at any one point. Likewise, we realized that we could not operate well from fixed bases. To do so would have meant building up one big land base after the other, a slow process even where the land was available, and then abandoning them as we advanced closer and closer to the Japanese mainland. Also, there were too few harbors in the Pacific that lent themselves to the construction of big bases.

"There was only one answer—to put the services afloat. This was done. And as a result, the United States Navy today can go anywhere in the world, and take its supply base right along with it. The striking power of the American Fleet is unlimited. We are now in a position to seek out the Japanese Navy wherever it elects to hide.

"From here on out, American warships can operate increasingly closer to the Japanese mainland. Strike after strike can be made. No longer do the fighting ships have to drop back thousands of miles to a port in order to make ready for the next thrust. The necessary ammunition, fuel, supply and repair facilities, constantly will be within ready range. This means a material shortening of the length of the war."

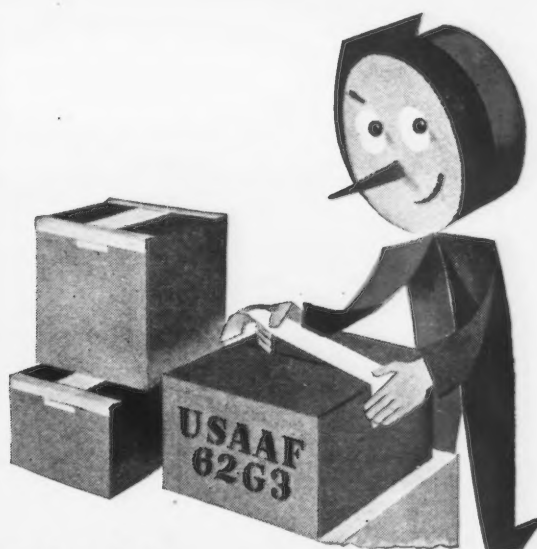
The current operation of the Fifth Fleet, the Okinawa operation, represents the biggest supply job and logistic problem ever tackled by any Navy. The amount of supplies necessary to prepare the Naval and amphibious forces for this single thrust against the Japanese is imagination-staggering. This was the job of Squadron Ten.

The ships of the task force were loaded with the equivalent of 1500 freight cars of ammunition for the Okinawa operation. This is the biggest operation of its kind in Naval history. The tremendous job of loading these thousands of tons of bombs, torpedoes and shells was accomplished afloat.

Divided among the various repair ships, destroyer tenders and floating drydocks, over 6000 craftsmen were engaged in repairs to the many vessels being fitted out for this operation. Many tons of material and thou-



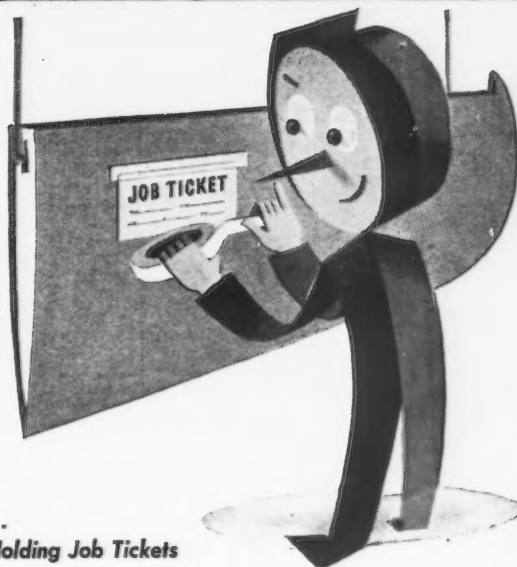
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## NEWS OF INDUSTRY

sands of feet of wire were used by the machinists, shipfitters, electricians, and carpenters in readying the fleet for this operation.

All kinds of parts, which in peace time conditions would have been discarded, are being repaired by Service Squadron Ten because of material and parts shortages. All the make-shifts that American ingenuity can devise are employed to keep the units of the Squadron and the ships of the Fleet operating.

Everything that can possibly be used again is salvaged, from a small tool to a huge anchor. When the hull of a boat has been too badly damaged on the coral reefs to be repaired, the engine is yanked out to be placed in a good hull.

The big repair ships of the squadron carry tons of pig iron aboard to use in the manufacture of replacement parts which can not be obtained. Even some of the structural steel purchased from American mills by the Japanese to use in their installations and captured from them is now being employed against them to repair battle-damaged ships of our Navy.

### Plant Expansion Totals Two and a Half Billions

Cleveland

• • • A war-time plant expansion amounting to \$2,500,000,000 in the Fourth Federal Reserve District, has meant an unprecedented increase in every industrial field, according to a study recently made by O. E. Burley, industrial economist of the Federal Reserve Bank here.

Three times as much money was spent for equipment as for new plants or plant expansion, Mr. Burley said. Groups which showed the greatest growth were iron and steel, machinery and electrical equipment, machine tools and aircraft. A little more than two-thirds of the money spent for industrial expansion in the district has come from government sources.

"Use of war built plant facilities in the Fourth Reserve district may result in a general step-up in plant efficiency during the postwar period," Mr. Burley added. He emphasized plant disposal in each region must be examined in each region as a separate problem.



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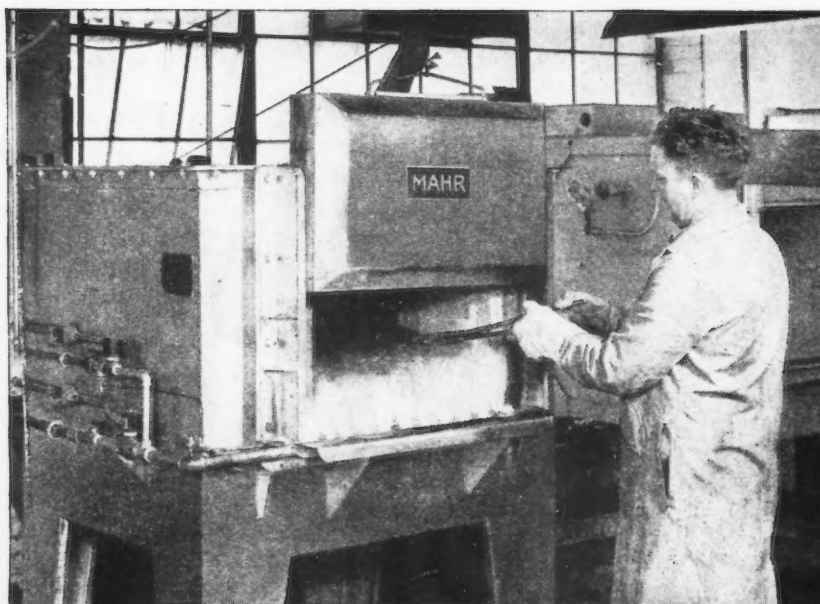


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## Fourth Lend-Lease Report Raises Total Above \$38 Billions

### Washington

• • • From March 11, 1941, to the end of March 1945, the United States furnished its allies lend-lease goods and services valued at \$38,971,797,000, President Harry S. Truman reported to Congress last week. In addition to direct lend-lease this country also consigned \$874,382,000 worth of supplies to commanding generals in the field for subsequent transfer to allied forces under lend-lease. By Jan. 1, 1945, the United States received \$4,656,315,000 worth of reverse lend-lease supplies, of which \$3,352,247,000 was furnished by the United Kingdom; \$720,673,000 by Australia; \$171,419,000 by New Zealand and \$411,976,000 by India.

Munitions, including ships, constituted by far the largest amount of direct lend-lease. They were valued at \$19,546,840,000 or 50.2 per cent of the total. Ranking next were industrial materials and products valued at \$7,944,157,000 or 20.4 per cent of the total.

The United Kingdom received the greatest amount of lend-lease supplies, taking \$12,775,392,000 worth of goods or 43.6 per cent of the total. Second was the Soviet Union, which was sent supplies valued at \$8,409,695,000 or 28.7 per cent of the total.

Shipments of munitions to the United Kingdom were valued at \$6,430,397,000. The largest items in this category were aircraft and parts, \$2,213,266,000; ordnance and ammunition, \$1,880,151,000 and tanks and parts, \$1,020,978,000. Shipments of industrial materials and products to the United Kingdom were valued at \$1,866,575,000. Shipments of these supplies, the report said, have been greatly curtailed since British orders for capital equipment subsequent to Nov. 15, 1943, and exports of iron and steel to the United Kingdom subsequent to Dec. 31, 1944, have been on a cash basis.

Shipments of munitions to the Soviet Union were valued at \$4,151,591,000. The largest items in this class of material were aircraft and parts, \$1,495,966,000 and motor vehicles and parts, \$1,157,064,000. Shipments of industrial products to the U.S.S.R. were valued at \$2,700,223,000. This country sent to Russia 13,300 airplanes, more than to any other ally. Also sent to Russia were 6800 tanks, 1800 self-propelled guns and 135,000

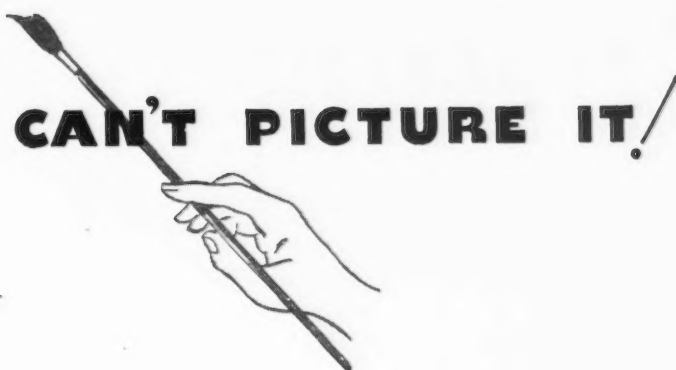
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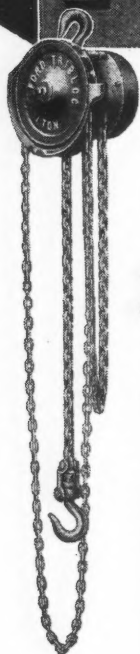
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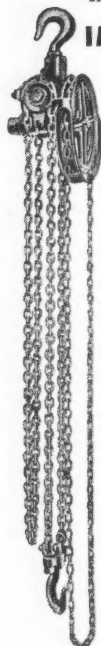
LSS-2



# ASK YOUR DISTRIBUTOR ABOUT THE FORD LINE



**TRIBLOC** Quality spur-gear, ball-bearing hoist. Made throughout of high-grade drop-forgings and malleable castings of certified grade. Low in both first-cost and maintenance expense.



**IMPROVED SCREW HOIST** This sturdy, dependable hoist was designed primarily for use where it is necessary to have a portable hoist. It is especially useful for riggers, general repair men, or in foundries where exceptionally smooth operation is required.

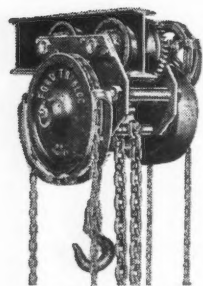


**PORT-O-BLOC** This FORD hoist is patterned after the differential type but is made much more efficient through the introduction of ball bearings at axial points.

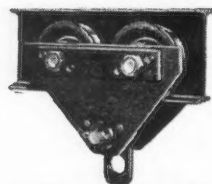


## DIFFERENTIAL

Here is the simplest construction of all hand hoists. It has the advantages of light weight, portability, and low price.



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PLAIN OR GEARED**



**PLAIN OR GEARED**

• For extended hand wheel hoists, chain winches, jib cranes, or complete hoist units, your distributor is the man to see. Send today for specification bulletin on FORD HOISTING EQUIPMENT.

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**ACCO**



Philadelphia, Chicago, San Francisco, Denver,  
Los Angeles, Portland, Bridgeport, Conn.

**FORD CHAIN BLOCK DIVISION  
AMERICAN CHAIN & CABLE**

*In Business for Your Safety*

submachine guns, 406,000 motor vehicles, 1500 locomotives, 9800 flat cars, 1000 dump cars, 100 tank cars, 540,000 tons of steel rails and 116,000 tons of railroad wheels and axles.

Reverse lend-lease aid was mostly in the form of supplies and services furnished American armed forces overseas. Many of the bombs our air force dropped in Europe were rocket-propelled bombs, specially designed and made by the British to pierce the concrete structures that the Nazis had erected over important installations. Many of the fighter escorts were P-51 Mustangs. Original plans for these came from British and American drafting boards. The planes were built in American war plants but many of them used the liquid-cooled Packard-built British Merlin airplane engine. Many of the detachable auxiliary gas tanks that gave the planes additional range so that they could protect American bombers on long raids over Germany and the gyroscopic gun sight that eliminated guesswork and greatly increased the "kills" registered by the pilots were reverse lend-leased.

"Adjustments and reductions in allied war production and in the lend-lease program will be possible even as we and our allies throw augmented forces into the decisive offensives against Japan," President Truman told Congress. "The task of reconversion and reconstruction is commencing. At the same time lend-lease and reverse lend-lease must continue as a military necessity on the scale required to build the overwhelming power which alone can save American and Allied lines and bring an early and complete end to this terrible war."

## Household Restrictions Lifted

*Washington*

• • • Revoking L-30-d, WPB has lifted restrictions on the use of iron and steel to make 24 household articles, including carpet sweepers, hand clothes wringers, can openers, and garment hangers, as well as prohibition of the use of metal to bread boxes, carpet beaters and numerous other items for civilians. At the same time, L-52, restricting production of bicycles, was revoked.

Under the open-ended CMP, manufacturers may place orders for copper, steel and allotments, and mills may fill such orders to the extent that it does not interfere with deliveries under authorized CMP allotments. Manufacturers now may place orders for delivery on this basis after July 1.

## Construction Industry Faces Major Tests In Postwar Period

### New York

• • • Three major tests face the construction industry if it is to enjoy a sustained prosperity after the war, Thomas S. Holden, president, F. W. Dodge Corp., told the Building Contractors Association of New Jersey recently.

The first test, Mr. Holden said, will be whether the industry can get past the early revival period without a disastrous inflation of construction costs. The second will be whether the industry can progressively broaden its market by reducing costs after the period of inflation danger is passed. The third test is whether the industry and those related influences which create construction demand can successfully control the boom.

"The construction industry alone cannot itself exercise control in all these areas or alone achieve the right answers to all three questions," Mr. Holden said. "It must, however, accept its proper share of responsibility."

Mr. Holden said that construction costs in March 1945, were on the average 28 to 30 per cent above the year 1939. Both material prices and wages are likely to rise further after ceilings are lifted, along with prices of many other commodities, he said, and the threat of inflation will then be much greater than it has been during the war.

"If it proves possible, by judicious tapering of price regulation, and by intelligent self-restraint on the part of producers and suppliers of materials and on the part of building labor, to make the necessary postwar adjustments of construction costs in an orderly manner, a great difficulty, possibly a great disaster, will be averted," Mr. Holden said.

"Contractors will not be able to control prices or wages they pay. They can inform themselves as well as possible on the price situation and on current and anticipated material supplies. They can advise architects and clients as well as possible on the realities of the situation. They can try to secure as much cooperation as possible from labor, both in the matter of wage demands and in securing adequate manpower. As far as possible they should work with the unions on programs for apprentice training and for admission of qualified veterans into union membership.

# PAGE *for* WIRE

## ...AND THE RIGHT ANSWERS TO WIRE QUESTIONS

• If the question has to do with wire or the use of wire in production, **PAGE** can serve you. Wire and its application have always been the business of **PAGE**.

### WHAT SIZE WIRE?

What size will do the job best and most economically? **PAGE** can give you the answer—and supply the wire.

### WHAT SHAPE SECTION?

**PAGE** makes wire in many standard shapes. If you need a special shape, **PAGE** can make it for you—in end-section areas to .250" square—widths to 3/8". You draw the shape—**PAGE** can draw the wire.

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**PAGE** is regularly drawing wire of high and low carbon steel, Armco ingot iron, stainless steel, special alloys. Heat-treating and finishes to required specifications.

### WHICH WELDING ELECTRODE?

**PAGE** offers a wide range of welding electrodes and gas welding rods, including **PAGE-Allegheny** stainless steel.

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Are you tying up too much capital in single-purpose machines?

Are you flexible enough to quickly adapt to changing conditions?

Is your fixed overhead on machine tools too high?

**How to Save Money on Your Retooling Investment**  
... yet stay in a position to maintain volume and quality

MA-20

## ... with flexible, low-cost Delta-Milwaukee Machine Tools

**Present production experience suggests many money-saving applications . . .**

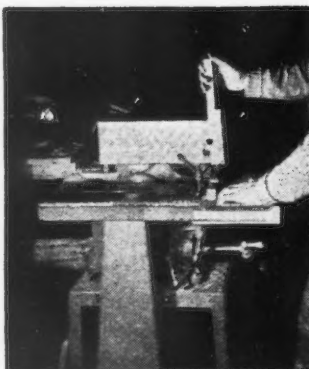
Delta provides a modern approach to tooling, without the delay and heavy capital risk involved in buying costly, inflexible machines of limited usefulness. You substantially cut your fixed investment in machine tools . . . retain more liquid working capital for other needs.

By utilizing the portability and compactness of stock-model Delta components, you can build high-production, special-purpose machines that can be quickly converted when requirements change. You can modernize obsolete machines by replacing worn units. You can quickly revise or supplement production-line layouts for increased output.

Delta's savings in cost, weight, and space are due to modern production methods applied to a large volume of standard models; not to short-cuts in quality.

For a flexible, safe, satisfactory solution to the uncertain production problems that lie ahead — and for results that are creditable to all concerned — tool up with low-cost Delta-Milwaukee Machine Tools.

**Delta's 76-page Blue Book** provides 140 case histories of valuable war production experience that help you visualize — and utilize — the versatility of Delta-Milwaukee Machine Tools, as many others have done. Also available is a catalog of low-cost Delta-Milwaukee Machine Tools. Request both, using coupon at right.



Above: A typical example of adapting standard, low-cost Delta machines to special-purpose units. By affixing two additional arbors above the saw table, a Delta 10" Circular Saw is converted into an efficient, accurate tenoning machine. A dado head is mounted on the regular saw arbor and another dado head directly above it. Towards the operator is mounted a saw blade. Four or five pieces in a clamping fixture are run through at a time and in one operation are cut to length and tenoned. The entire set-up is quickly reconverted to use as a regular circular saw.

**Delta**  
MILWAUKEE  
Machine Tools



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## Pennsylvania Ores May Find New Favor In Pittsburgh Mills

### Pittsburgh

... The iron ore deposits of the Cumberland Valley, Pa., that helped supply Revolutionary armies with arms and aided in the birth of colonial industries, may possibly become important sources of ore for western Pennsylvania mills, according to Dr. Richard M. Foose, of the Pennsylvania Bureau of Topographic and Geologic Survey. Today, less than five per cent of the iron ore mined in this country comes from Pennsylvania, and all but a fraction of this comes from the large magnetite mine at Cornwall, about 45 miles away, in Lebanon County, which is not part of the Cumberland Valley deposit.

Dr. Foose bases his expectations upon the fact that Lake Superior deposits of high grade ores have been pretty well worked over, and the Lake Superior low grade ores are not any better than the ores of the Cumberland Valley. This equality of grade, he believes, will remove one serious economic barrier to the working of the Cumberland Valley ores. Furthermore, working of the local ores would not entail the stocking of ore at the blast furnace for winter use, since the mines can be operated all year around and transportation will not be tied up by freezing lakes.

Said Dr. Foose, "Perhaps the most serious barrier to renewed operation of Cumberland Valley ores is the development of metallurgical methods to concentrate the ore and to lower the phosphorous content. Generally speaking, most of the ores in the Tomstown (Cumberland Valley) dolomite are high in phosphorous. Actually, the phosphorous is not too high for most purposes, but blast furnace practice frowns on using high phosphorous ore and places severe penalties on it."

"There are two answers to this problem," Dr. Foose pointed out, "and probably the best is a combination of the two. First, some metallurgical method must be devised to decrease the phosphorous content. Second, the blast furnace operators must lower their sights in setting their analytical specifications, for it is amply demonstrated that we shall not always be able to use only high grade ores."

There will not again be an iron industry "overnight" in the heart of the valley, but the possibilities for renewed activity in iron mining seem good.

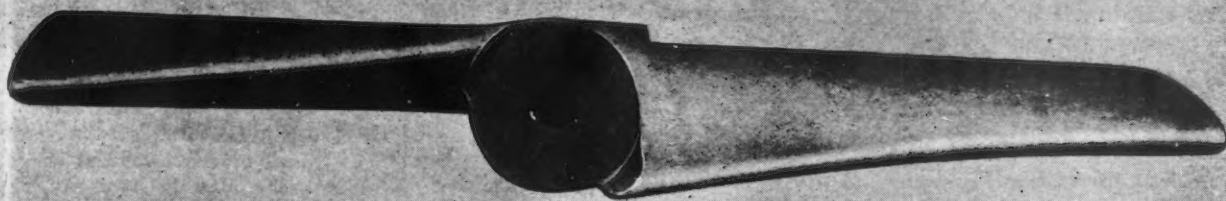




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*that go down to the Sea*

These Stern Frame Castings for Landing Ships, pictured above and below, illustrate part of the extensive work we've been doing for the marine industry—along with rudder posts, stern tubes, bed plates, anchors of all sizes, and similar items. In each case, these castings have the highly uniform grain structure, strength and dependability that the Navy demands, but there's nothing special about these qualities as far as we're concerned. They are characteristics that you'll find in *all* castings by PSF, and the best of all reasons for specifying them. • Let us figure on your casting needs.



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THE IRON AGE, June 7, 1945—131

W & D 9870

## Latest Warehouse Order Covers Steel Stock Replacements

### Washington

• • • A new plan to enable steel warehouses to replace their stocks will become effective July 1, through the issuance of Direction 3 to Order M-21. The current Order M-21-b-3, under which steel warehouses obtain stock replacements, will be revoked on July 15. The 15 days overlapping period of the two orders was established to allow warehouses to order replacements of tonnage sold from stock through June 30, under the present plan, up to July 15.

The new direction establishes seven groups of steel products under which warehouses must collect CMP allotments for the purpose of ordering stock replacements, if they wish to order on an authorized controlled materials order basis. The first group embraces all types of stainless steel, while the other six groups cover the entire range of alloy and carbon steel products in controlled material form.

Under the M-21-b-3 plan, a warehouse could order replacements of any general steel product based on deliveries of an equivalent tonnage of the same or any other general steel product from his stock. The purpose of establishing the seven groups of steel products specified in Direction 3 is to prevent a warehouse from using allotments obtained from the delivery of a product purchased on unrated orders to order a product in another group obtainable only on authorized controlled material orders.

Steel products sold on a Z-3 symbol (the permissible symbol given to small business firms under Priorities Regulation 27) may be replaced by a warehouse on the same basis as steel delivered on other CMP symbols. Steel products sold on an unrated order may be replaced from steel mills only on an unrated basis.

### Staggered-Hours Plan Lapses

#### Buffalo

• • • The Buffalo War Council's executive committee has decided not to take any action "at present" for renewal of the staggered-hours schedule for business and industry of the city, which is scheduled to expire June 30. The decision is in keeping with the announced policy "to relax all wartime controls and regulations as fast as practicable," it was explained.

## Now Available NEW 6" I.D.

**REX-FLEX S.S. FLEXIBLE  
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• To meet new industrial requirements in many fields, REX-FLEX Stainless Steel Flexible Metal Tubing is now being produced in a new 6" I.D. size! This latest addition to the C.M.H. line of flexible metal hose makes possible the use of REX-FLEX in numerous new applications. Sizes now range from  $\frac{5}{16}$ " to 6" I.D. (Incl.). Five standard wall formations are available.

In addition, this new 6" flexible metal tubing has all these outstanding REX-FLEX features: 18-8 *Austenitic Stainless Steel* . . . *Non-Corrosive* . . . *Withstands Extremes of Temperature* . . . *Light Weight in Comparison to Strength* . . . *Great Burst and Crush Strength* . . . *High Fatigue Resistance* . . . *High Vibration Qualities* . . . *Pressure Tight for Liquids and Gases* . . . *Manually Bendable in Multiple Planes* . . . *Fittings Seam Welded to Form Uni-Metal Assemblies*.

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Flexible Metal Hose for Every Industrial Use



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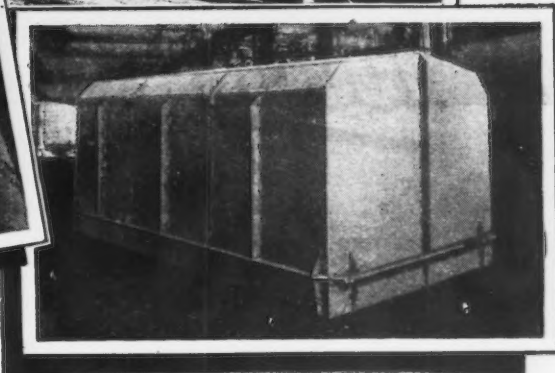
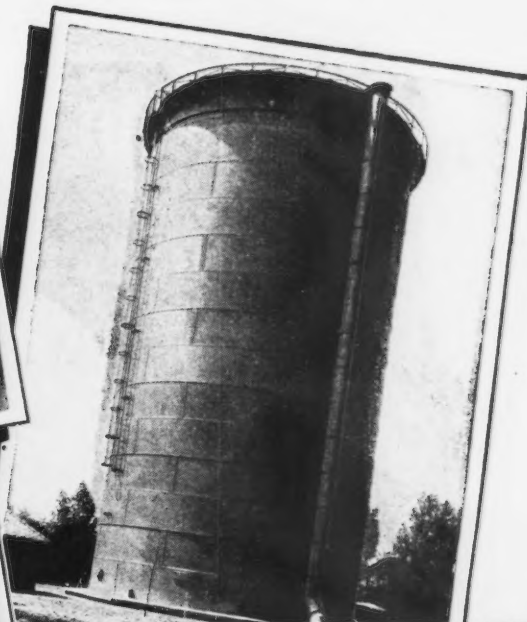
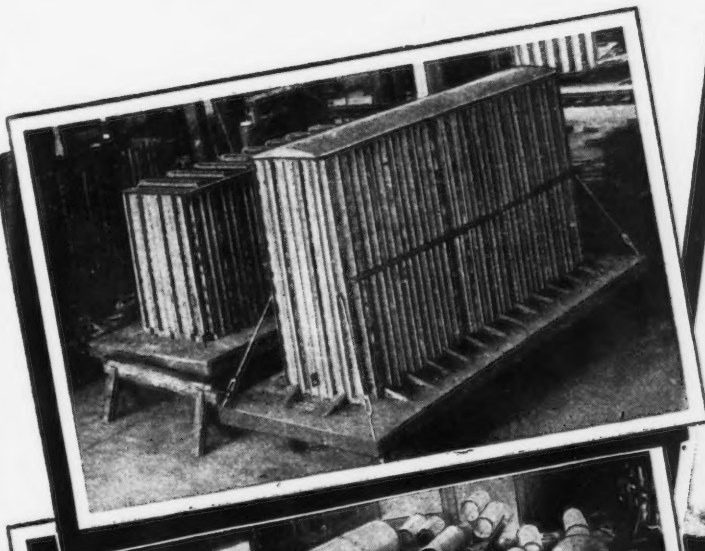
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Backed by wide and varied experience in the successful handling of "big" jobs, General American, through its Plate & Welding Division, offers *complete* manufacturing facilities on a long line of specialized products for the iron and steel industry.

From stacks to standpipes . . . tanks or towers . . . pipes or pressure vessels—every item is precision-engineered. And X-ray inspection, heat-treating and stress-relieving furnaces, plus a thoroughly-equipped organization for field erection, either in this country or abroad, combine to insure a really complete service to our users.

General American is prepared to handle practically any job you may be contemplating. Write for any individual information you may require.

Accumulators  
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# TOUGH CUTTING JOB

● On many kinds of jobs, **CAMPBELL ABRASIVE CUTTING MACHINES** are speeding production and cutting costs. But abrasive cutting shows up best on unusual — really tough — cutting operations.

Instead of our describing the complete range of **CAMPBELL ABRASIVE CUTTING MACHINES**, we would rather have you tell us your specific problem. If it is difficult, perhaps we can simplify it. If it is simple, we may help you to speed up and economize production.

## WHY NOT DO THIS?

Write and tell us (1) the range of sizes, (2) kind of material, (3) length of cutoff pieces, (4) length of stock before cutting, (5) tolerance for length of cut pieces and (6) hourly production requirement. With this information as a basis, **CAMPBELL** engineers can recommend production procedure and work up cost sheets for you.

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**ABRASIVE CUTTING MACHINES**

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ANDREW C. CAMPBELL DIVISION  
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## Steel Foundrymen Are Honored by Industry

### Chicago

● ● ● At the annual meeting of the Steel Founders' Society of America held here recently, three members were honored for outstanding contributions to the steel castings industry.



O. E. Mount

Oliver E. Mount, vice-president, secretary and treasurer, American Steel Foundries, Chicago, and retiring president of Steel Founders' Society of America, was accorded recognition for his outstanding record

during the past three years.

Claude L. Harrell, vice-president of Sterling Steel Casting Co., East St. Louis, Ill., and chairman of the Steel Castings Industry Advisory Committee to the Office of Price Administration, was presented the Frederick A. Lorenz



C. L. Harrell

Memorial Medal for 1944. This gold medal is awarded to the individual adjudged by the board of directors to have made the most outstanding contribution to the general welfare of the industry during the preceding year.



E. A. Walcher

Edwin A. Walcher, vice-president of Ohio Steel Foundry Co., Lima and Springfield, Ohio, was presented with the newly created Technical and Operating Medal of the society for 1944. This medal, which was established in late 1944, is awarded annually for outstanding contribution toward the advancement of the technical and operating developments of the Industry during the preceding year.

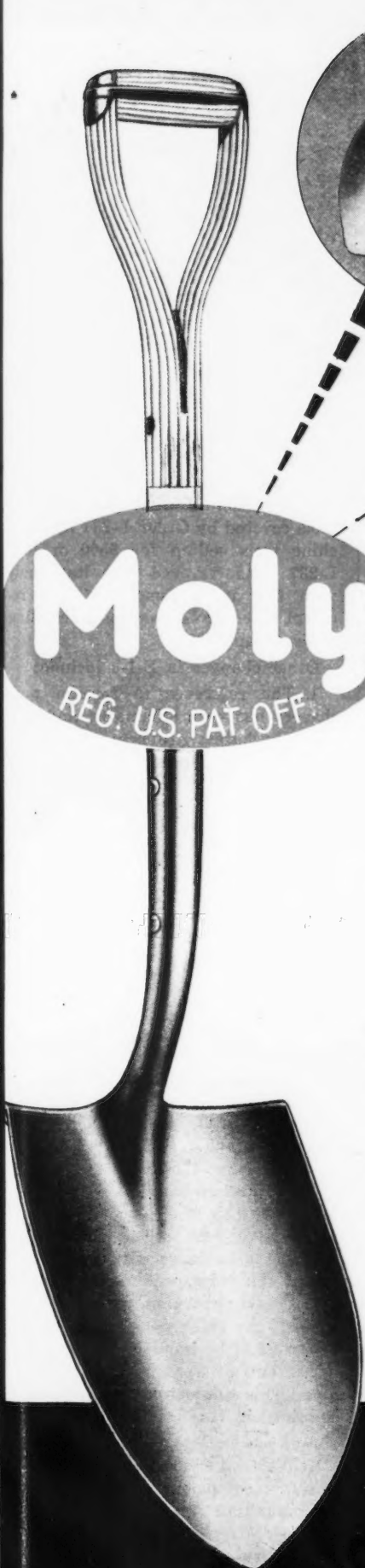
This award was made to Mr. Walcher for the demonstration of foundry technique employed in the development of cast steel breech rings for field, naval and aircraft ordnance.

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**Mo-lyb-den-um Alloy Steel Blade . . .** The toughest strongest wearing blade found in any brand of shovels.

**Moly D Handle . . .** The strongest yet most comfortable shovel grip made. Never checks or splits . . . no rivets to come loose.

**Steel I-Beam Handle Reinforcement . . .** Adds 30% and MORE strength where 65% of handle breaks occur.

**Closed Back Blade . . .** Both blade and socket heat treated . . . blade and frog strengthened.

## THEY ALL ADD UP TO The Finest Shovel Made



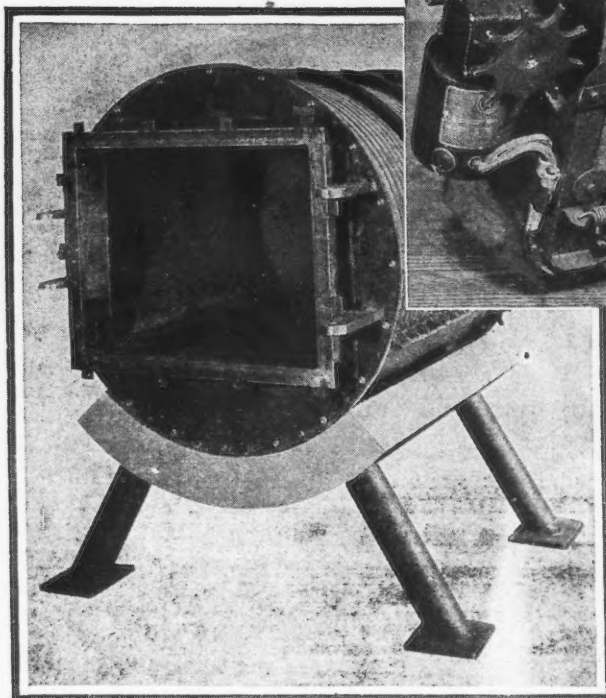
Moly shovels and scoops are all around better because each point of strain and wear is specially reinforced by an exclusive construction feature originated and developed by the Wood organization. Compare a Moly from end to end with any other shovel made and you'll find Moly markedly superior in ways that you can actually see.

Under normal conditions Moly shovels and scoops are available in the exact type and size required for the individual job. Get the habit now of specifying Moly when you buy shovels . . . because the name Moly on the order means final shovel costs which are lower.

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A National Organization Specializing Exclusively in Shovels, Spades and Scoops

# MO-LYB-DEN-UM ALLOY SHOVELS



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**3,800 lb. Electro-Processing Oven**, fabricated by Brandt for a cork board plant.

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If your postwar production will include some fabrication to be done by a reliable, experienced, metal-working organization . . . Brandt of Baltimore can fill a definite need for you.

For over 50 years Brandt has fabricated metal for scores of industrial uses. Present products range from small, formed units of a few ounces to huge fabricated assemblies weighing 30 tons. The Brandt 8½ acre plant has complete, modern equipment for shearing, rolling, forming, welding. Machine capacities range from the lightest gauge up to and including 1¼" mild steel or ¾" armor plate. All metals, ferrous, non-ferrous and alloy, can be completely fabricated to your specifications.

And if you've hit a snag on your postwar product, our designers and engineers will welcome the opportunity to assist in planning the details and specifications. Naturally, all plans will be held in strict confidence. So if there are fabrication or design problems in your postwar plans, we invite you to discuss them with—

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## Restrictions Lifted On Low Cost Tools Under Amended E-1-b

### Washington

• • • WPB announced on May 23 that all special controls over the production and distribution of machine tools having a retail sales price of less than \$1000 have been removed by amendment of Order E-1-b, the machine tool distribution and production orders. Hereafter, application of the order, WPB said, will be limited to machine tools listed on Exhibit A that have a retail sales price of \$1000 or more. Previously, the order covered all machine tools listed on Exhibit A with the exception of light power driven tools covered by Order L-237 and machine tools selling for \$500 or less. L-237 was revoked simultaneously with the announcement of the removal of controls over tools retailing at less than \$1000.

Other changes in E-1-b include:

1. The reference to foreign purchasers has been eliminated and foreign purchasers are now included in the term "other purchasers." Actually, under the previous order, foreign and other purchasers were treated alike and the new wording is more a simplification than a change.
2. Paragraph (f) (1) of the previous order has been revoked. The paragraph provided that machine tools having a retail sales price of more than \$500 could only be rated on Forms FEA-419, WPB-541, WPB-542 or WPB-1319.
3. Machine tool purchasers are still required to furnish the information called for by paragraph (f) (2), but the requirement for a photostatic copy of the WPB-542 has been eliminated.
4. Paragraph (j) has been amended to provide that the frozen period applies to machine tools scheduled for delivery within the next 60 days, or which have been scheduled for delivery in accordance with paragraph (c) of the order.
5. A new paragraph (m) has been added to the order, permitting specific directions to be issued concerning the disposition of second-hand machine tools. This authority was previously contained in E-4, which is revoked as of May 23.

Exhibit A includes all types of the following equipment:

Ammunition machinery; bending machines; bending rolls; boring machines; brakes; broaching machines; buffing machines; centering machines;



**Constant  
Metallurgical  
Research**



**A VITAL ELEMENT IN  
ILLINOIS CUTTING TOOLS**

Progress in metal cutting tool efficiency demands constant research with new alloys. Illinois Tool metallurgists through continuous experimentation have developed many new qualities in high speed steel which are producing exceptional results on a wide variety of metal cutting applications. Enjoy the benefits of this research by asking for an Illinois Tool engineer. Your tooling will be analyzed in consultation with our metallurgists to assure properly engineered tools produced from the alloy proved most efficient for your purpose.

Overnight to All America . . .  
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**TOOL WORKS**

MANUFACTURERS OF METAL CUTTING TOOLS AND SHAKEPROOF PRODUCTS

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## The "Armstrong System" permits the new higher cutting speeds

The urgencies of war have led to the universal use of greatly increased cutting speeds. Today it is not uncommon to find production machine tools actually operating *many times faster* and with greater efficiency than the "standard" cutting speeds of past generations permitted. What is not generally understood is that a similar step-up is equally practical for ordinary operations on standard tool room lathes, planers and shapers.

With the correct ARMSTRONG TOOL HOLDERS for each operation and modern ARMSTRONG HIGH SPEED, ARMIIDE (Carbide-Tipped) and ARMALLOY (Cast-Alloy) Cutters, Bits and Blades you can safely increase both speeds and feeds materially, reducing machining time per operation or piece and substantially raise your output per machine-hour.

With the Armstrong System you can make this change-over to high speed operation at will, for ARMSTRONG TOOL HOLDERS and ARMSTRONG CUTTERS are stocked by the leading industrial tool departments in your locality and can be purchased as needed. Start the "modernizing" program now. Write for catalog.

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chamfering machines; crankshaft grinders, stationary; cut-off machines; die casting machines; sinkers; draw benches; drilling machines; duplicators; extruding machines; filing machines; forging machines; forging rolls; gear cutting machines; gear finishing machines; grinding machines; hammers; heat treaters; honing machines; keyseater machines; lapping machines.

Lathes; levelers; marking machines; milling machines; nibbling machines; oil grooving machines; pipe flanging-expanding machines; planers; polishers; presses; profiler machines; punching machines; reaming machines; rifle and gun working; riveting machines; sawing machines; screw and bar machines; shapers; shearing machines; slotters; swagers; tapping machines; thread rollers; threading machines; tube reducers; upsetters; wire drawing machines.

## Enameled Ware Relieved

### Washington

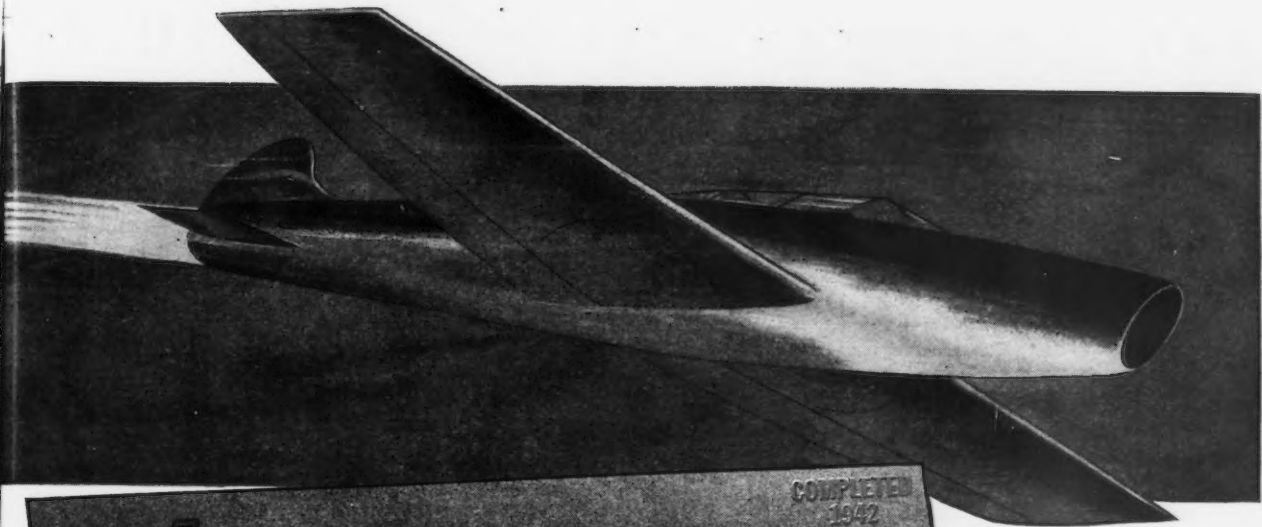
... With the revocation of order L-30-b reported on May 26 by WPB, manufacture of enameled ware beyond present levels will be dependent only on the availability of materials, facilities and manpower. However, this will not result in an appreciable increase in enameled ware for civilians this year, WPB officials predicted, because of shortages of certain materials and, in some areas, manpower.

Until July 1, when CMP is to be open-ended, manufacturers who wish to use iron and steel to increase production of items formerly controlled by L-30-b will be dependent upon materials available from idle and excess stocks. Meanwhile, they may place orders with the mills for delivery after July 1. These orders may then be filled, but only to the extent that they do not interfere with deliveries of authorized CMP allotments.

Under L-30-b, manufacturers, consumption of iron and steel for civilian enameled ware production was restricted to 70 per cent of usage in the year ended June 30, 1941. Usage for military and export was restricted to 55 per cent of the same base year.

Items whose production was controlled by L-30-b were: enameled cooking ware, household articles (pails, buckets, tubs, infants bathtubs, dish pans, sink strainers and baby bottle sterilizers), enameled cabinets, commodes, chambers and certain hospital enameled ware items.

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**ARCOS and AUSTENITIC ARMOR WELDING**

COMPLETED  
1942

**ARCOS and FERRITIC ARMOR WELDING**

COMPLETED  
1944

**ARCOS and JET PROPULSION WELDING**

COMPLETED  
1945

Under a secrecy order, Arcos has been working for over two years on an electrode to weld the new metals developed for jet propulsion planes. The electrode must produce a weld metal that will withstand the great temperatures and stresses encountered in the engines of these speed demons of the air.

Arcos may not disclose publicly the chemistry or the physical properties of this new

weld metal. It can and hereby does advise those involved in the manufacture of jet propulsion engines, that it is prepared to give them the proper electrode.

Arcos didn't seek this problem—the problem sought Arcos. It is only one of several tough ones solved by Arcos, and we are always prepared to take on new ones. That's the way Arcos makes friends.



ARCOS CORPORATION • 304 GULF BUILDING, PHILA. 2, PA.



Your Arcos Distributor is well informed. Your Arcos Distributor has stock.

Allen Reigel  
Boston, Mass.  
Buffalo, N. Y.  
Chicago, Ill.  
Cincinnati, Ohio  
Cleveland, Ohio  
Columbus, Ohio  
Detroit, Michigan

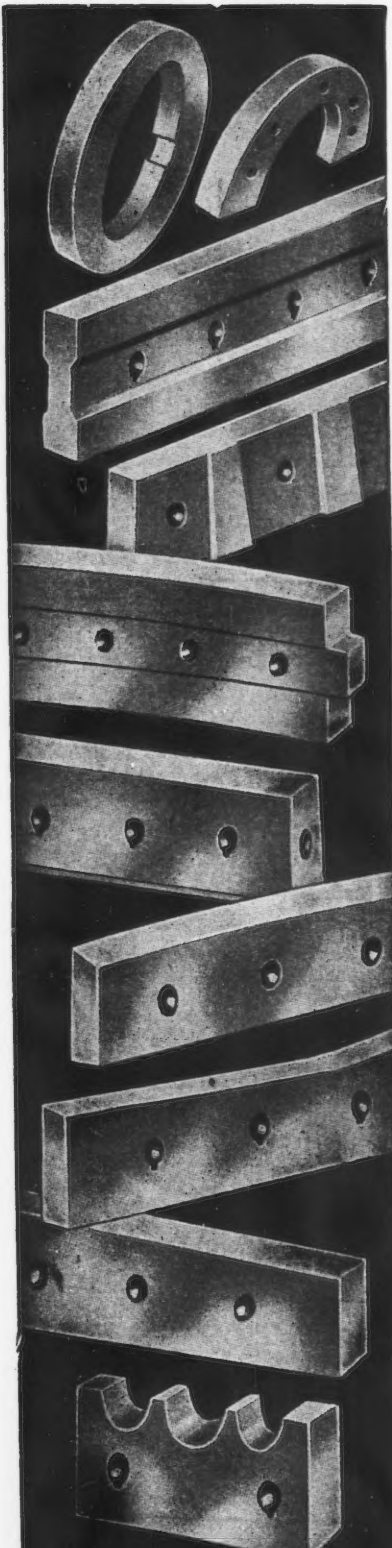
Boyd Welding Co.  
Victor Equipment Co.  
Wayne Welding Sup. Co., Inc.  
Hawaiian Gas Products, Ltd.  
Champion Rivet Co. of Texas  
Welders Supply & Repair Corp.  
Slip-Not Belting Corp.  
Victor Equipment Co.  
Machinery & Welder Corp.

Moline, Ill.  
Montreal, Canada  
New Orleans 13, La.  
New York, N. Y.  
Oklahoma City, Okla.  
Pampa, Texas  
Pittsburgh, Pa.  
Portland, Ore.  
Rochester, N. Y.

San Diego, Calif.  
San Francisco, Calif.  
Seattle, Wash.  
Spokane, Wash.  
St. Louis, Mo.  
Syracuse, N. Y.  
Tulsa, Oklahoma  
Wichita, Kansas







Greater Tonnage  
Per Edge of Blade

**A**

**AMERICAN  
SHEAR KNIFE CO.**  
HOMESTEAD · PENNSYLVANIA

## NEWS OF INDUSTRY

### WPB Cracks Down On Contractors Failing To Cancel With Cuts

Washington

• • • WPB has cracked down on contractors who have not cancelled steel and other orders after receiving military cutbacks.

WPB Chairman J. A. Krug recently announced the opening of a drive to obtain prompt cancellation of all orders stemming from contracts that have been cut back.

Mr. Krug said that, to provide materials for civilian production, it was important that order boards of all suppliers—including controlled and other materials, components and containers—be cleared of military orders as soon as contract cutbacks are made. He emphasized the requirements of CMP Regulation 1 and Priorities Regulation 1, which cover the return of allotments and cancellations of purchase orders by suppliers following the cancellation of their customers' orders.

Mr. Krug also stressed the fact that the first objective of industry must continue to be the full satisfaction of all direct military and war-supporting needs until the end of the war with Japan. He cited, as a secondary objective, the full utilization of all released materials, labor and facilities for civilian production.

Letters are being sent to large users of materials and companies that have received contract cutbacks, calling their attention to the necessity of reviewing their inventory position and advance purchase commitments in order that they may cancel all possible orders for controlled and other materials, components and containers and return unused controlled-materials allotments to the persons from whom the allotments were received.

Detroit

• • • The Norge Division of Borg-Warner Corp. hopes to complete negotiations for a factory site at Herin, Ill., and plans to concentrate laundry equipment manufacture there as soon as a plant can be constructed.

The plans make another step in a program of plant decentralization. Last fall the company bought a plant in Effingham, Ill., for electric and gas range output. Factories at Muskegon and Muskegon Heights, Mich., will manufacture electric refrigerators and develop new products.

### COKE PUSHER SHOE

**LASTS  
4 TIMES  
LONGER**

**WHEN HARD-FACED  
WITH COAST METALS**

Moving tons of fiery coke, a pusher shoe grinds ponderously over brick and steel 50 to 60 heats a day. The strain is enormous—uncoated shoes at a mid-western plant needed shimming every 2 or 3 weeks to offset wear. Shoes were replaced 3 times a year—until hard-facing with Coast Metals was employed. Now shoe life has been lengthened over four times.

This coated shoe, 38" x 12" x 3 1/2", installed in September 1943, served until March 1945—a total of 18 months as against 4 months obtained formerly. Total cost of time and materials—\$39.00. Compare this with \$256.50, the cost of 4 1/2 new shoe replacements that were dispensed with! What's more, the hard-faced shoe needed no shimming at all.

Savings like these, in labor, down-time and money, can be yours with Coast Metals Hard-Facing. Use it on any ferrous metal part that must resist wear, impact, shock, heat. Ask our engineers to recommend applications that will lengthen equipment life in your plant.

COAST METALS, INC.

Plant and General Offices:

1232 Camden Ave., S.W., Canton 6, Ohio

Executive Offices:

2 West 45th Street, New York 19, N. Y.

**COAST  
METALS**

*hard-facing weld rods*

**MAKE YOUR  
EQUIPMENT  
LAST LONGER**

# Houghton's 3 C's for preventing



## CLEAN SURFACES

You can't protect a dirty surface against rust. Dirt comes from handling, from dust or chemical fumes in the air, from metallic residues, cutting or drawing compound deposits, salts or quenching oil left on the parts. These substances in combination with moisture always present in the air increase corrosion. They must be removed before applying preventives.

## CAREFUL CHOICE

A rust preventive must be selected on the basis of protection first, but there are other points to consider: lubricating qualities, if required; removability, type of part to be protected, method of application. Ordinary oils or greases not inhibited, will not give long time protection. The reputation and experience of the supplier counts greatly when seeking advice as to the most efficient type of rust preventive to use.

## CORRECT APPLICATION

This may depend on the means at hand, the size of the part, its design. An effective coating must be continuous and of the necessary thickness on all surfaces, so that an unbroken film is maintained. Dipping, spraying and brushing are the usual methods for applying "removable" coatings. Required temperature at which to apply, amount of solvent to be evaporated, type of spray gun, type of tank—all these and more must be considered before setting up a rust preventive production line.

Corrosion prevention has been a responsibility of E. F. Houghton & Co. since it first supplied rust preventives to the government in 1867. This present global war increased the seriousness of the problem, on which research has been never-ending. For recommendations on protection in shipment or storage, contact the Houghton Man, or write direct to E. F. Houghton & Co., 303 W. Lehigh Ave., Phila. 33, Pa.

*Houghton's*

**RUST PREVENTION SERVICE**

## Magnesium Alloy Aircraft Casting Inspection

(CONTINUED FROM PAGE 63)

surface treatments the chrome pickle method is an accepted and thoroughly reliable one. It is widely used.

One of the troublesome discontinuities encountered in the fabrication of magnesium alloy sand castings are small gas bubbles which are, as a rule, covered by a thin but tough skin of oxide. Usually these aerated areas are just beneath the surface and in all probability would have blown out through the sand were it not for the tough oxide skin which keeps them entrapped beneath the surface of the metal.

### Visual Inspection Procedure

The general procedure is to inspect all castings prior to removing gates, risers and sprues. This practice is carried out to preclude the possibility of wasting valuable time finishing an already defective casting. This visual check is usually followed by an additional check following heat treatment.

As a third step it has been found to be worth while to carry out visual inspection following surface coating and this is illustrated in this paper.

While sand blasing usually removes the thin oxide skin above mentioned, it has been determined that this is not always true. If no inspection operation is carried out following surface coating, many castings will be passed as serviceable which later may be returned to the fabricator as rejected material.

By virtue of the fact that the surface coating operation is the final step, one would assume that this is the ideal time to take a final glance at the castings prior to crating for shipment.

In this instance it has been noticed by the author and others that, following dichromate pickling, certain changes in color on the surface of the casting is indicative of further investigations. Where small brown

patches were noticed after surface coating, for example, exploration with a sharp tool would disclose these discolored areas as oxide under which would be found a cavity. Some of these were small cavities and others such as that shown in the illustration, rather large and quite deep. The brown patches are easily detected and readily separated from the uniform yellow gold color of the metal which was surface coated. Inspectors checking magnesium alloy castings after surface coating should watch for these brown patches and when found should carefully apply a sharp tool to the area to determine whether or not the area represents oxide skin. The skin will lift easily from the surface of the metal and no undue pressure of the exploring tool is necessary.

This is illustrated in the photograph which shows a section of a magnesium alloy casting. At the top is shown the section after sand blasting where it appears perfectly sound. At the bottom is seen the same casting after surface coating and exploration with a tool. Two small aerated areas were present and showed as brown patches after surface coating. This brownish area was lifted off and underneath were the cavities.

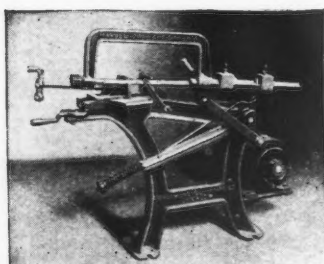
Each casting detected as defective in the foundry will, of course, tend to reduce ultimate rejections from prime contractors. Thus, with good inspection an improvement soon will be noted in quality control.

### Returns to Private Business

Washington

• • • The resignation of Russell C. Duncan, deputy director in charge of surplus sales and merchandising, was announced recently by the Department of Commerce. His resignation became effective on May 21 at which time he returned to private business as head of the R. C. Duncan Co. of Minneapolis and St. Paul, Minn.

Mr. Duncan has served as a dollar-a-year man for the government for practically four years. His original assignment included the expansion of the industrial supplies industry as an associate chief in the Machine Tool Division of the Office of Production Management. Subsequently as director of field operations for the War Production Board Redistribution Division, he set up the field organization responsible for exchange of production materials between industrial plants.



**80%**  
of all Small Shop  
Saws are "Marvels"!

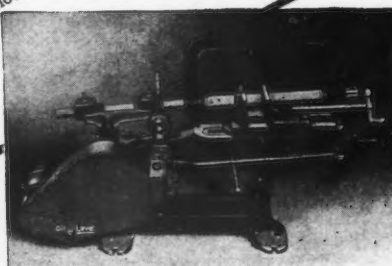
**No. 1 Draw Cut Hack Saw.** A dry cut, 4" x 4" capacity. A sturdy saw well-known for its dependability, economy, and invaluable service in the small shop or shop department. Simple and efficient with low original, maintenance, and blade cost.

**MARVELSAWS**  
**No. 2 Draw Cut Hack Saw.** Companion to the No. 1 but with a normal 6" x 6" capacity which can be increased to 8" x 8" by shortening the stroke with adjustable crank. The No. 2 MARVEL also has a swivel vise which is removable from the "T" slotted base. Both machines are available in belt and motor driven models. Motor driven models can also be furnished mounted on portable truck.

### Complete Range of Metal Sawing Machines

Being the largest exclusive manufacturer of metal sawing machines and blades, both hack saw and band saw type, we have the correct answer to your cut-off problems. Each MARVEL model has a distinct application, so write us and we will send our catalog, price, and recommendation for the saw to fill your requirements most efficiently. MARVEL sawing engineers are also available to discuss and analyze your cut-off work. (Without obligation of course)

**ARMSTRONG-BLUM MFG. CO.**  
5700 W. Bloomingdale Ave., Chicago 39, Illinois, U. S. A.





# McKAY

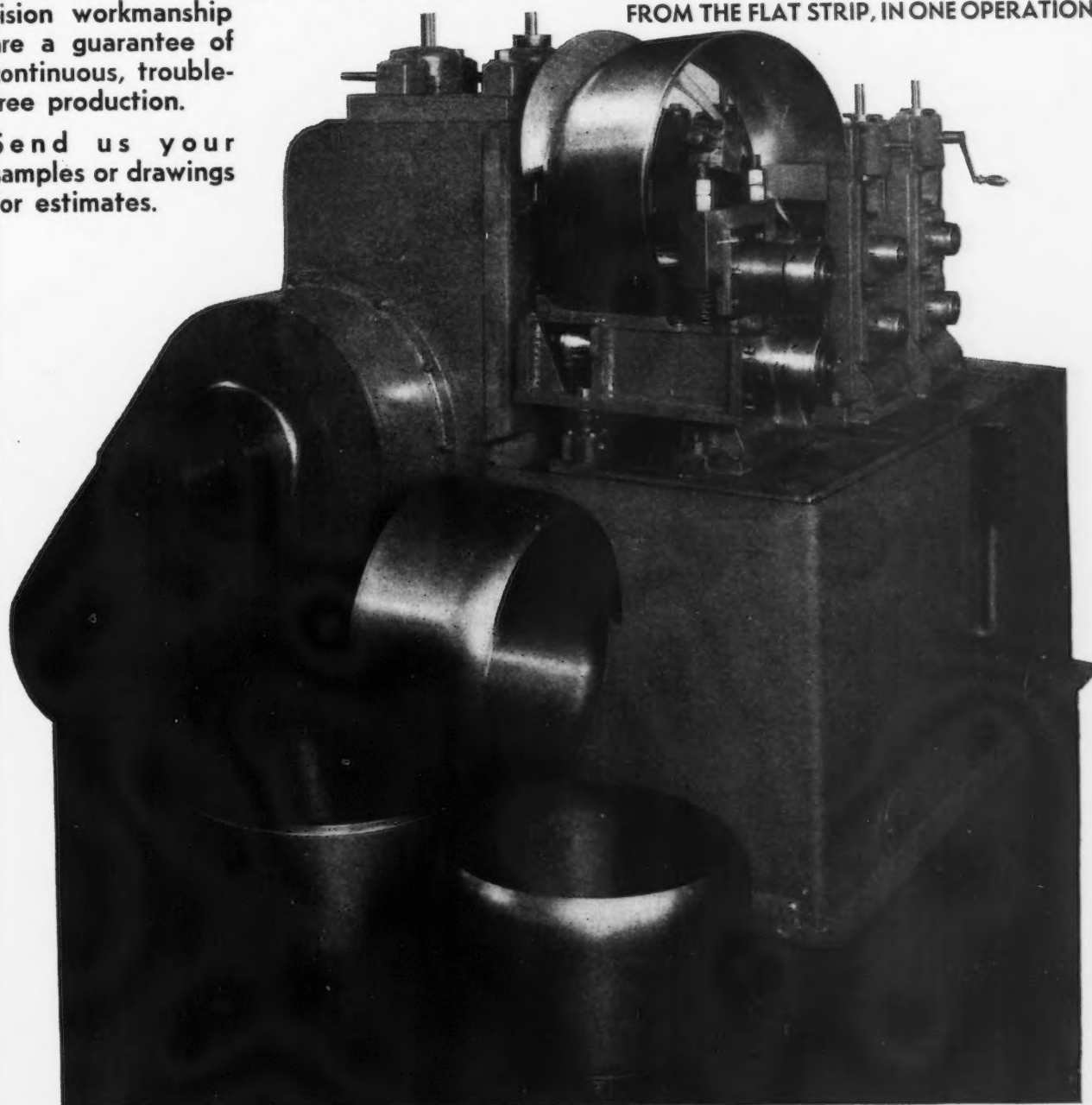
## COMBINATION FORMING AND BENDING MACHINE

THE machine illustrated emphasizes the versatility of McKay equipment, for use in the manufacture of parts which must be coiled into rings.

Typical, rugged McKay construction plus up-to-the-minute engineering and precision workmanship are a guarantee of continuous, trouble-free production.

Send us your samples or drawings for estimates.

FOR FORMING AND COILING RING SHAPES  
FROM THE FLAT STRIP, IN ONE OPERATION



*The* **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF TUBE AND BAR DRAWBENCHES AND BAR SHEARS

YOUNGSTOWN, OHIO

# MACHINE TOOLS

... News and Market Activities

## Russian Cancellations Stir Industry

### Cleveland

• • • A matter of considerable concern to some machine tool builders is the Russian situation; cancellations are gradually flowing in for machines scheduled for delivery later in the year, and to put it mildly, the companies involved are not particularly happy.

For the most part, manufacturers of the big, special machines stand the best chance of being in a pickle, but at the moment, it would be difficult to determine just how many companies may be affected since the orders were pretty well distributed. Some quarters estimate that as many as 20 companies will be involved, and in a few of these, the Russian orders are a solid lump ahead, replete with AA-1 priority. And although these companies are in some little stir over the final outcome, they must proceed according to plan until the orders are stopped or cancelled.

Obviously these cancellations will have some sizeable repercussions; companies building special machines can't very well divert these orders somewhere else, particularly when equipment is designed around a special operation on some part. Also, a lot of engineering work has been done on some of these projects before they ever reached the shops, and now that

cancellations are coming, the manufacturers involved have already done plenty of work for which the government has paid or will pay them, but about six or eight weeks from now big holes will show up in their production probably because nothing has come along to replace the canceled orders.

As a result, Russian cancellations may put some manufacturers behind six or eight weeks, since a hole in the engineering department today becomes a hole in the shop later on. Stemming from this, the possibility of layoffs has been considered, representing limited and questionable alleviation at best and the risk that these men may not be available later on.

It can be easily seen that this is not merely a question of payment, but a loss of productive capacity in the shops as well. Perhaps fortunately, little is known as to the number or size of these cancellations, and it has been pointed out that the situation may not be as serious as it now appears. One might almost assume that by the end of the year most of those AA-1 Russian orders had been or would have been finished.

Now, this situation is further complicated in that we cannot ship to Russia under lend-lease; they are not a co-belligerent and according to the

Johnson Act, which prohibits loans to countries already in default, we cannot lend them money. In fact, very little can be done unless President Truman gets what he is asking Congress for, a rescinding of the Johnson Act, which will allow us to loan money to Russia.

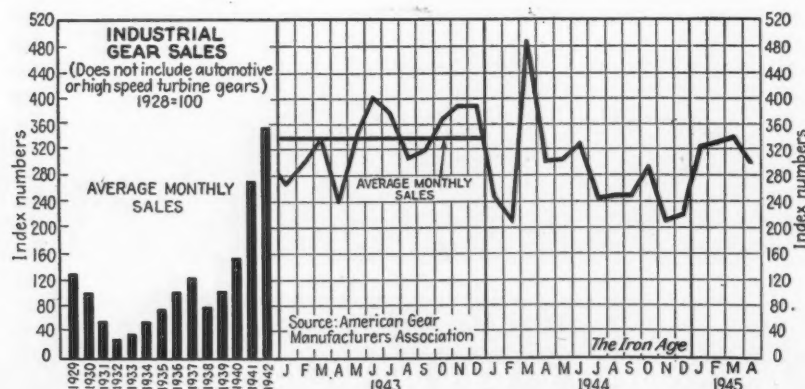
These Russian cancellations have not created any particular problem here, since the local industry hasn't many machine tool orders for them. But the hope has been expressed that perhaps the French, Belgians and Dutch will be able to take a lot of machine tools off our hands. If surplus machines should be given them under some agreement, units which have been used to any great extent might be taken into machine tool builders' shops and cleaned up and, at the same time, provide some additional work for the industry.

According to reports, the Russians aren't interested in surplus stuff, and until the present time under lend-lease, there was little reason why they should have been. Quite understandably, they have wanted the best right along, and since they had a choice, who can blame them for taking it? Russia has been asking for machine tools consistently and the only limiting factor has been available shipping space.

Machines involved in the current cancellations are doubtless part and parcel of the Russian reconversion program. Apparently, the Russians cannot make the more complex and exacting machine tools for themselves.

## April Gear Sales Decrease

... The gearing industry, as represented by the members of the American Gear Manufacturers Association, shows a decrease in volume of sales for April, as compared with March, of 12.7 per cent. This report does not include turbine or propulsion gearing. The index figure for April was 296.



## Market Remains Quiet

### Cincinnati

• • • The district machinery market is without interesting features. Builders are dusting off post-war orders and setting them on schedules for the earliest date permissible in view of present "urgencies." Latest features on new tools are being perfected to catch the attention of reconversion shoppers. The postwar business is reported to be in good quantity but the still fairly steady flow of war orders is shunting the peace business aside. Plants are still running at capacity on present labor forces, while still in the market for additional good men.

# NEW SUPER CUTTERS FOR CAST IRON!



## NOW...

### THREE LINES OF SUPER CARBIDE TIPPED CUTTERS PROVIDE A CUTTER FOR EVERY METAL — EVERY JOB!

In line with its policy of constant development and improvement, Super Tool Company announces a new line of carbide tipped milling cutters designed specifically for use on cast iron, malleable iron, brass, bronze and similar metals.

Now . . . whatever your job, whatever the type of metal you are milling, you will find a Super Carbide Tipped Cutter designed to bring you faster, more efficient, more economical production. For the new cutters mentioned above are in addition to Super's line of general purpose cutters for aluminum, dural, magnesium and plastics and its line of carbide tipped cutters for steel that has established such amazing records of production and economy the country over.

Next time you order milling cutters, step up your production while you step down your costs by specifying Super Carbide Tipped Cutters designed specifically for the work you are doing.

Phone . . . wire . . . write today for complete information on Super Tool's new line of Carbide Tipped Milling Cutters for Cast Iron.

#### OTHER CARBIDE TOOLS FOR . . .

Turning, Facing, Ream-  
ing, Forming, Spot Facing,  
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Special Purposes.



## SUPER TOOL COMPANY

*Carbide Tipped Tools*

21650 Hoover Road, Detroit 13, Michigan



4105 San Fernando Road, Glendale 4, California



# NON-FERROUS METALS

... News and Market Activities

## Copper Wire Mill Order Is Altered

Washington

• • • The amount of copper wire mill products for which a warehouse may enter warehouse stock replacement orders in any calendar month was increased from the previous 25 per cent to 33 1/3 per cent of deliveries made from stock during the second quarter of 1944 by amending Direction 4 to CMP Regulation 4, WPB announced May 25.

## Army and Navy Officers Authorize Re-use of Inhibiter

New York

• • • Due to shortages of ingredients required for zinc chromate primer as a corrosion inhibiting finish for aluminum and magnesium alloy, joint action has been taken by the Army Air Forces, Navy Bureau of Aeronautics and Aircraft Resources Control Office of the Aircraft Production Board to authorize the use of reclaimed primer for the purpose. In view of the critical nature of the zinc chromate situation, contractors not in a position to reclaim their own primer for reuse are advised to channel the sludge through commercial reclaimers.

## Japan's Nonferrous Position

New York

• • • In the summary released by Leo T. Crowley, foreign economic administrator, of the present economic and industrial power and war-making capacity of Japan, it was stated that "with the allied advances in Burma, the available supply of tungsten, lead, zinc and nickel is reduced, but there are stockpiles and other sources of these materials in the inner zone. With the loss of the Philippines, the chrome and copper position becomes more difficult, but not impossible because of substitute metals. Tin and rubber from the south are reported to have been stocked in Japan in quantities sufficient to meet war requirements for many months."

## Ease Restrictions On Copper and Products

Toronto

• • • Lifting of all restrictions on the purchase and use of copper wire, copper sheet and tube, wrought copper and copper alloy products, has been announced by the Munitions Department. Until now, a metals control permit has been required before copper sheet or tube could be used in the construction or repair of buildings or municipal water services.

The announcement said the orders controlling copper wire bar, copper wire rod, copper wire, red copper and copper alloys are being replaced by one order which establishes a permit basis for sales of copper by refineries and sales of copper wire rod by the mills. Restriction on inventories of woven wire products in the pulp and paper industry also have been removed.

## Brass Mills Can Accept Unrated Orders Before July

Washington

• • • CPM has been "open ended" for delivery of brass mill products on unrated orders five weeks in advance of the July 1 date set for the general release of controlled materials on unrated orders, WPB has announced. Because supplies of brass mill products have been made available through contract cutbacks and cancellations, CMP regulations 1 and 4 have been amended in order to permit unrated orders for immediate delivery of brass mill products.

## Offer Bronze Propellers

Washington

• • • A large number of new and used three-blade manganese bronze propellers have been declared surplus and are now for sale by the United States Maritime Commission. The propellers range from 18 to 48 in. dia. with varying pitches and are priced from \$17.33 to \$265 each. Buyers can secure further information by writing to the Materials Disposal Section, Contract Settlement and Surplus Materials Division, U. S. Maritime Commission, Washington 25, D. C.

## Channel Pipeline Lead Extruded in A Vacuum

New York

• • • Extruded lead to the extent of 1.82 million lb. went into the production of one transchannel gasoline supply line produced by the General Cable Corp. known as H AIS or hollow armored insulated submarine cable. This pipeline, with an overall length of 35 miles, had a total weight of 5 million lb. Over 3 in. i.d., and 4 1/2 in. o.d., the weight per ft. equalled 27.7 lb. per sq. in. It cost approximately \$4 to \$4.50 per ft.

In order to stand the pressure of its own weight while the full length was coiled waiting shipment, the lead contained in the bottom half of the line was hardened by alloying with 2 per cent tin. The top half of the line, when coiled, contained only 0.1 per cent tin and 0.06 per cent copper.

The gas pipeline was extruded at the Bayonne, N. J., plant in 2500 ft. lengths, which were trucked over to the Perth Amboy plant for joining and finishing operations.

In order to prevent inclusions from contaminating the lead content of the pipeline, the General Cable Co. employed a process for vacuum extrusion in which the lead is isolated from contact with the air.

## Lead and Zinc Officials Protest Extension of Trade Act

New York

• • • Protests on the extension of the Reciprocal Trade Agreements Act were registered before the Senate Finance Committee, by officials of the Lead Industries Association and the American Zinc Institute, who had previously appeared before the House Ways and Means Committee.

Secretary Julian D. Conover of the American Mining Congress also appeared before the Senate committee to request the exclusion from further duty reductions under the act of strategic and critical minerals and metals listed by the Army and Navy Munitions Board. The board has recommended to Congress the creation of permanent stockpiles of these materials.

# NONFERROUS METALS PRICES

## Primary Metals

(Cents per lb., unless otherwise noted)

|                                                                |                      |
|----------------------------------------------------------------|----------------------|
| Aluminum, 99+%, del'd (Min. 10,000 lb.)                        | 15.00                |
| Antimony, American, Laredo, Tex.                               | 14.50                |
| Beryllium copper, 3.75-4.25% Be; dollars per lb. contained Be. | \$17.00              |
| Cadmium, del'd                                                 | 90.90                |
| Cobalt, 97-99% (per lb.)                                       | \$1.50 to \$1.57     |
| Copper, electro, Conn. valley                                  | 12.00                |
| Copper, electro, New York                                      | 11.75                |
| Copper, lake                                                   | 12.00                |
| Gold, U. S. Treas., dollars per oz.                            | \$35.00              |
| Indium, 99.9%, dollars per troy oz.                            | \$4.00               |
| Iridium, dollars per troy oz.                                  | \$120.00             |
| Lead, St. Louis                                                | 6.35                 |
| Lead, New York                                                 | 6.50                 |
| Magnesium, 99.9 + %, carlots                                   | 20.50                |
| Magnesium, 12-in. sticks, carlots                              | 27.50                |
| Mercury, dollars per 76-lb. flask, f.o.b. New York             | \$154.00 to \$157.00 |
| Nickel, electro                                                | 35.00                |
| Palladium, dollars per troy oz.                                | \$24.00              |
| Platinum, dollars per oz.                                      | \$35.00              |
| Silver, open market, New York, cents per oz.                   | 44.75                |
| Tin, Straits, New York                                         | 52.00                |
| Zinc, East St. Louis                                           | 8.25                 |
| Zinc, New York                                                 | 8.65                 |

## Remelted Metals

(Cents per lb. unless otherwise noted)

|                               |                |
|-------------------------------|----------------|
| Aluminum, No. 12 Fdy. (No. 2) | 9.00 to 10.00  |
| Aluminum, deoxidizing         |                |
| No. 2, 3, 4                   | \$6.00 to 9.50 |
| Brass Ingot                   |                |
| 85-5-5-5 (No. 115)            | 13.25          |
| 88-10-2 (No. 215)             | 16.75          |
| 80-10-10 (No. 305)            | 16.00          |
| No. 1 Yellow (No. 405)        | 10.25          |

## Copper, Copper Base Alloys

(Mill base, cents per lb.)

|                                     | Extruded Shapes | Rods  | Sheets |
|-------------------------------------|-----------------|-------|--------|
| Copper                              | 20.87           | 20.37 |        |
| Copper, H.R.                        |                 | 17.37 |        |
| Copper drawn                        |                 | 18.37 |        |
| Low brass, 80%                      |                 | 20.40 | 20.15  |
| High brass                          |                 |       | 19.48  |
| Red brass, 85%                      |                 | 20.61 | 20.36  |
| Naval brass                         | 20.37           | 19.12 | 24.50  |
| Brass, free cut                     |                 | 15.01 |        |
| Commercial bronze, 90%              |                 | 21.32 | 21.07  |
| Commercial bronze, 95%              |                 | 21.53 | 21.28  |
| Manganese bronze                    | 24.00           |       | 23.00  |
| Phos. bronze, A, B, 5%              |                 | 36.50 | 36.25  |
| Muntz metal                         | 20.12           | 18.87 | 22.75  |
| Everdur, Herculey, Olympic or equal |                 | 25.50 | 26.00  |
| Nickel silver, 5%                   |                 | 28.75 | 26.50  |
| Architect bronze                    | 19.12           |       |        |

## Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (1/4H); 52S, 61c. (O); 24S, 67 1/2c. (T).

Plate: 0.250 in. and heavier: 2S and 3S, 21.2c.; 52S, 24.2c.; 61S, 22.3c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness: 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 28c.; 61S, factor No. 1 to 4, 28 1/2c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3, screw machine stock. Rounds: 1/4 in., 28 1/2c. per lb.; 1/2 in., 26c.; 1 in., 24 1/2c.; 2 in., 23c. Hexagonals: 1/4 in., 34 1/2c. per lb.; 1/2 in., 28 1/2c.; 1 in., 25 1/2c.; 2 in., 25 1/2c. 2S, as fabricated, random or standard lengths. 1/4 in., 24c. per lb.; 1/2 in., 25c.; 1 in., 24c.; 2 in.,

23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.137 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27 1/2c.

## NONFERROUS SCRAP METAL QUOTATIONS

(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

### Copper, Copper Base Alloys

#### OPA Group 1†

|                                                     |       |
|-----------------------------------------------------|-------|
| No. 1 wire, No. 1 heavy copper                      | 9.75  |
| No. 1 tinned copper wire, No. 1 tinned heavy copper | 9.75  |
| No. 2 wire, mixed heavy copper                      | 8.75  |
| Copper tuyeres                                      | 8.75  |
| Light copper                                        | 7.75  |
| Copper borings                                      | 9.75  |
| No. 2 copper borings                                | 8.75  |
| Lead covered copper wire, cable                     | 6.00* |
| Lead covered telephone, power cable                 | 6.04  |
| Insulated copper                                    | 5.10* |

#### OPA Group 2†

|                                    |        |
|------------------------------------|--------|
| Bell metal                         | 15.50  |
| High grade bronze gears            | 13.25  |
| High grade bronze solids           | 11.50* |
| Low lead bronze borings            | 11.50* |
| Babbitt lined brass bushings       | 13.00  |
| High lead bronze solids            | 10.00* |
| High lead bronze borings           | 10.00* |
| Red trolley wheels                 | 10.75  |
| Tinny (phosphor bronze) borings    | 10.50  |
| Tinny (phosphor bronze) solids     | 10.50  |
| Copper-nickel solids and borings   | 9.25   |
| Bronze paper mill wire cloth       | 9.50   |
| Aluminum bronze solids             | 9.00   |
| Soft red brass (No. 1 composition) | 9.00   |
| Soft red brass borings (No. 1)     | 9.00   |
| Gilding metal turnings             | 8.50   |
| Contaminated gilded metal solids   | 8.50   |
| Unlined standard red car boxes     | 8.25   |
| Lined standard red car boxes       | 7.75   |
| Cocks and faucets                  | 7.75   |
| Mixed brass screens                | 7.75   |
| Red brass breakage                 | 7.50   |
| Old nickel silver solids, borings  | 6.25   |
| Copper lead solids, borings        | 6.25   |
| Yellow brass castings              | 6.25   |
| Automobile radiators               | 7.00   |
| Zincy bronze borings               | 8.00   |
| Zincy bronze solids                | 8.00   |

#### OPA Group 3†

|                                     |       |
|-------------------------------------|-------|
| Fired rifle shells                  | 8.25  |
| Brass pipe                          | 7.50  |
| Old rolled brass                    | 7.00  |
| Admiralty condenser tubes           | 7.50  |
| Muntz metal condenser tubes         | 7.00  |
| Plated brass sheet, pipe reflectors | 6.50  |
| Manganese bronze solids             | 7.35† |
| Manganese bronze solids             | 6.25† |
| Manganese bronze borings            | 6.50† |
| Manganese bronze borings            | 5.50† |

#### OPA Group 4†

|                |       |
|----------------|-------|
| Refinery brass | 4.75* |
|----------------|-------|

\*Price varies with analysis. †Lead content 0.00 to 0.40 per cent. ‡Lead content 0.41 to 1.00 per cent.

## Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

### Other Copper Alloys

|                                     |       |
|-------------------------------------|-------|
| Briquetted Cartridge Brass Turnings | 8.625 |
| Cartridge Brass Turnings, Loose     | 7.875 |
| Loose Yellow Brass Trimmings        | 7.875 |

## Aluminum

### Plant scrap, segregated

|                                      |      |
|--------------------------------------|------|
| 2S solids                            | 8.00 |
| Dural alloys, solids 14, 17, 18, 24S |      |
| 25S                                  | 5.00 |
| turnings, dry basis                  | 3.00 |
| Low copper alloys 51, 52, 61, 63S    |      |
| solids                               | 7.50 |
| turnings, dry basis                  | 5.75 |

### Plant scrap, mixed

|                     |      |
|---------------------|------|
| Solids              | 4.00 |
| Turnings, dry basis | 2.50 |

### Obsolete scrap

|                           |      |
|---------------------------|------|
| Pure cable                | 8.00 |
| Old sheet and utensils    | 6.00 |
| Old castings and forgings | 5.00 |
| Pistons, free of struts   | 5.00 |
| Pistons, with struts      | 3.00 |
| Old alloy sheet           | 5.00 |

## Magnesium\*

### Segregated plant scrap

|                                          |      |
|------------------------------------------|------|
| Pure solids and all other solids, exempt |      |
| Borings and turnings                     | 1.50 |

### Mixed, contaminated plant scrap

|                              |      |
|------------------------------|------|
| Grade 1 solids               | 3.00 |
| Grade 1 borings and turnings | 2.00 |
| Grade 2 solids               | 2.00 |
| Grade 2 borings and turnings | 1.00 |

\*Nominal.

## Zinc

|                                 |      |
|---------------------------------|------|
| New zinc clippings, trimmings   | 6.50 |
| Engravers, lithographers plates | 6.50 |
| Old zinc scrap                  | 4.75 |
| Unsweetened zinc dross          | 5.00 |
| Die cast slab                   | 4.50 |
| New die cast scrap              | 4.45 |
| Radiator grilles, old and new   | 3.50 |
| Old die cast scrap              | 3.00 |

## Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

## Nickel

NI content 98+%, Cu under 1/4%, 26c. per lb.; 90 to 98% NI, 26c. per lb. contained NI.

## ELECTROPLATING ANODES AND CHEMICALS

### Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

|                                        |        |
|----------------------------------------|--------|
| Copper, frt. allowed                   |        |
| Cast, oval, 15 in. or longer           | 25 1/2 |
| Electrodeposited                       | 18 1/2 |
| Rolled, oval, straight                 | 19 1/2 |
| Curved                                 | 20 1/2 |
| Brass, 80-20, frt. allowed             |        |
| Cast, oval, 15 in. or longer           | 23 1/2 |
| Zinc, cast, 99.99, 15 in. or longer    | 16 1/2 |
| Nickel, 99 per cent plus, frt. allowed |        |
| Cast                                   | 47     |
| Rolled, depolarized                    | 48     |
| Silver, 999 fine                       |        |
| Rolled, 1-9 troy oz., per oz.          | 58*    |

### Chemicals

(Cents per lb., f.o.b. shipping point)

|                                                           |       |
|-----------------------------------------------------------|-------|
| Copper cyanide, 1-5 bbls.                                 | 34.00 |
| Copper sulphate, 99.5, crystals, bbls.                    | 7.75  |
| Nickel salts, single, 425 lb. bbls., frt. allowed         | 13.50 |
| Silver cyanide, 100 oz. lots                              | 41.79 |
| Sodium cyanide, 96 per cent, domestic, 100 lb. drums      | 15.00 |
| Zinc cyanide, 100 lb. drums                               | 33.00 |
| Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed | 6.35  |

\*Price based on use of foreign silver.

## Conflicting Trends Active in Market

### New York

• • • There are scattered decreases in turnings prices in the market this week, but what might be considered to be the most significant development was reported from Pittsburgh where a large consumer is said to have dropped out of the market in order to permit past-ordered scrap to accumulate. This could be the forerunner of a general unwillingness by mills to add to inventories in the face of obviously approaching munitions cutbacks. In recent weeks it has been reported from the East that one of the largest consumers in a number of markets there has been reducing offerings for all grades of scrap. This week it is said that that mill is no longer in the market for scrap at those prices.

On the other hand, Detroit this week reports moderate increases in machine shop turnings and short turnings, and that automotive lists brought higher prices on turnings than market quotations. Turnings were reported to be scarce this week in both Detroit, Chicago, Cleveland and Philadelphia and this development is credited to a drop in scrap generation as a result of cutbacks.

Moves to encourage the accumulation of scrap supplies, initiated in a period of ominous scrap shortage, have come to fruition at a time when scrap supplies may soon be in excess. The American Industries Salvage Committee, with headquarters at Rockefeller Plaza in New York, reports an extensive farm scrap salvage drive throughout western and mid-western states. In Montana an all-out program for heavy farm and industrial machinery has been started. Campaigns are active in Minnesota, South Dakota and Missouri.

It has also been reported recently that several boatloads of Pacific area battle scrap are enroute to mills in this country. Moreover, the Navy has mechanized and organized salvage operations to such an extent that much additional scrap could be shipped if needed by the industry.

The Bureau of Mines reports that stocks of scrap at plants of consumers, suppliers and producers continued to decline in March by somewhat less than 1 per cent. This inventory approximated 4,873,000 gross

tons at the end of the month. The drop was entirely due to decreases in consumers' inventories, since stocks at suppliers and producers appreciated by 1000 tons. Consumption of purchased scrap increased 300,000 tons over February to a figure of 2,141,000, while home scrap increased 475,000 tons to 2,748,000 tons during March.

**PITTSBURGH**—With a large consumer dropping out of the market for the time being in order to get some of the material it has bought into the plants, the scrap market here is somewhat freer in supply. While it is too soon to appear bearish on the heavier grades of scrap, dealers are careful about buying long, feeling that a break in price is not too improbable if this consumer remains out of the market for any length of time. The bulk of purchases of short turnings has been at \$16.00, but one dealer points out that it is difficult to buy them at the \$15.50 figure for sale at \$16.00. Alloy-free long and short machine shop turnings, according to one of the largest consumers in the district, are still bringing from \$13.00 to \$13.50.

**CHICAGO** — Secondary open hearth grades are showing increasing strength due to lack of availability of heavy melting steel in sufficient quantities to meet current requirements. Buying for immediate needs continues to typify the market. Maximum prices quoted on machine shop turnings and bundled machine shop turnings reflect spot orders placed by one mill last week, and continuing transactions at the lower portion of the range indicate that these top prices may not be duplicated in subsequent transactions. Renewed strength is evident in blast furnace scrap but transactions have not yet taken place above prices quoted.

**DETROIT** — Confirming a tendency noted in the past ten days, prices slipped modestly this week on machine shop turnings and strengthened on short turnings. Otherwise the list remained about as it was. Automotive lists again brought higher prices on turnings grades than going market quotations. Steel grades continued in heavy demand, probably induced, in part, by the reduced production of factory scrap due to war contract cutbacks.

**CLEVELAND**—While there have been no price changes here, the market is highlighted by the activity to procure blast furnace scrap which is very strong, and scarcer now than it has been for some time, probably due to cutbacks in the shell programs. Since the last cutback, which took a lot of turnings, everyone concerned is watching for the next cutbacks which are reported to be on the way. Mills here are using just about everything with very little going to the Valley.

**BUFFALO** — The scrap market was deadlocked during the last week as the principal mill interest cancelled overdue contracts and substituted lower bids. Another open hearth consumer also erased over-age commitments from the books and was reported on the sidelines awaiting developments in the tug-of-war. Dealers showed no inclination to sell heavy melting steel at lower prices, but small spot sales of machine shop turnings at \$11 jolted the light end of the list down another dollar. Cast grades are tight and low phosphorus is strong, but inquiries for one and two ft. steel rails are reported scarce. Boat shipments of scrap which had been expected from the lakehead failed to materialize. Marine circles heard the cargoes had been diverted to Chicago by the WPB.

**BOSTON**—Prices for heavier materials continue to take a wide spread. On new business \$14.06 a ton on cars Boston is the going price, but ceilings are still paid on old orders, quite a few of which remain unfilled. A Quincy yard is moving Bethlehem-Hingham shipyard material freely, more than 2000 tons the past week. Offerings include 1000 tons of plate. Foundries continue to take all the low phos and cast they can get at ceilings. Demand for machine shop turnings has eased off somewhat.

**NEW YORK** — Reports from dealers from this area indicate that Pittsburgh mills are continuing to buy in the New York market. However, it is said that three of the eastern Pennsylvania mills are out of the market, including the leading consumer from that district, who is reported not to be buying now even at the relatively low prices offered. Nevertheless, the market continues strong and prices remain without change.

**PHILADELPHIA** — The scrap market continues unchanged this week. Resistance to the price decline appears to be increasing as evidenced by the greater difficulty in obtaining bundles. Turnings are not as plentiful as previously, one factor in braking the downward price trend of this item. Cast remains at ceiling since demand is still strong.

**ST. LOUIS**—Receipt of scrap iron in the St. Louis industrial district for the first week of June are slightly off as compared with the preceding week, due to rains and shortage of manpower to gather and process the material in the outlying areas. Mills have made no further commitments for June, as had been expected, as they seem to be comfortably fixed now.

**BIRMINGHAM** — Despite a continued price firmness, demand has fallen off here for all grades of material and inventories are somewhat higher. A critical labor situation that has hampered scrap preparation in this area for months has begun to ease slightly. Shipyard scrap production has declined.



# IRON AND STEEL SCRAP PRICES

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

## PITTSBURGH

Per gross ton delivered to consumer:

|                        |                  |
|------------------------|------------------|
| No. 1 hvy. melting     | \$20.00*         |
| RR. hvy. melting       | 21.00*           |
| No. 2 hvy. melting     | 20.00*           |
| RR. scrap rails        | 21.50*           |
| Rails 3 ft. and under  | 23.00*           |
| No. 1 comp'd sheets    | 20.00*           |
| Hand bldd. new shts.   | 20.00*           |
| Hvy. axle turn.        | 19.50*           |
| Hvy. steel forge turn. | 19.50*           |
| Mach. shop turn.       | \$12.00 to 12.50 |
| Short shov. turn.      | 15.50 to 16.00   |
| Mixed bor. and turn.   | 14.50 to 15.00   |
| Cast iron borings      | 15.00 to 15.50   |
| Hvy. break. cast.      | 16.50*           |
| No. 1 cupola           | 20.00*           |
| RR. knuck. and coup.   | 24.50*           |
| RR. coil springs       | 24.50*           |
| Rail leaf springs      | 24.50*           |
| Rolled steel wheels    | 24.50*           |
| Low phos. bil. crops   | 25.00*           |
| Low phos.              | 22.50*           |
| RR. malleable          | 22.00*           |

## CHICAGO

Per gross ton delivered to consumer:

|                            |                  |
|----------------------------|------------------|
| No. 1 hvy. melting         | \$18.75*         |
| No. 2 hvy. melting         | 18.75*           |
| No. 1 bundles              | 18.75*           |
| No. 2 dealers' bndls.      | 18.75*           |
| Bundled mach. shop turn.   | \$16.25 to 18.50 |
| Galv. bundles              | 14.25 to 14.75   |
| Mach. shop turn.           | 10.50 to 12.00   |
| Short shov. turn.          | 12.00 to 12.50   |
| Cast iron borings          | 12.00 to 12.50   |
| Mix. borings & turn.       | 12.00 to 12.50   |
| Low phos. hvy. forge       | 23.75*           |
| Low phos. plates           | 21.25*           |
| No. 1 RR. hvy. melt.       | 19.75*           |
| Reroll rails               | 22.25*           |
| Miscellaneous rails        | 20.25*           |
| Rails 3 ft. and under      | 22.25*           |
| Locomotive tires, cut      | 22.50 to 23.00   |
| Cut bolsters & side frames | 19.75 to 20.25   |
| Angles & splice bars       | 22.25*           |
| Standard stl. car axles    | 23.50 to 24.00   |
| No. 3 steel wheels         | 22.00 to 22.50   |
| Couplers & knuckles        | 23.25*           |
| Agricul. malleable         | 22.00*           |
| RR. malleable              | 22.00*           |
| No. 1 mach. cast.          | 20.00*           |
| No. 1 agricul. cast.       | 20.00*           |
| Hvy. breakable cast.       | 16.50*           |
| RR. grate bars             | 15.25*           |
| Cast iron brake shoes      | 15.25*           |
| Stove plate                | 19.00*           |
| Clean auto cast.           | 20.00*           |
| Cast iron carwheels        | 20.00*           |

## CINCINNATI

Per gross ton delivered to consumer:

|                     |                |
|---------------------|----------------|
| No. 1 hvy. melting  | \$19.50*       |
| No. 2 hvy. melting  | 19.50*         |
| No. 1 bundles       | 19.50*         |
| No. 2 bundles       | 19.50*         |
| Mach. shop turn.    | \$7.00 to 7.50 |
| Shoveling turn.     | 8.00 to 8.50   |
| Cast iron borings   | 8.00 to 8.50   |
| Mixed bor. & turn.  | 7.00 to 7.50   |
| Low phos. plate     | 22.00*         |
| No. 1 cupola cast.  | 20.00*         |
| Hvy. breakable cast | 16.50*         |
| Stove plate         | 19.00*         |
| Scrap rails         | 21.00*         |

## BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

|                           |                     |
|---------------------------|---------------------|
| No. 1 hvy. melting        | \$14.06 to \$15.05* |
| No. 2 hvy. melting        | 14.06 to 15.05*     |
| No. 1 and 2 bundles       | 14.06 to 15.05*     |
| Busheling                 | 14.06               |
| Turnings, shovellings     | 7.50                |
| Machine shop turn.        | 5.50                |
| Mixed bor. & turn.        | 5.50                |
| CI'n cast, chem. bor.     | 13.06 to 14.15*     |
| Truck delivery to foundry |                     |
| Machinery cast            | 21.00 to 23.51*     |
| Breakable cast            | 21.57 to 21.87*     |
| Stove plate               | 20.00 to 23.51*     |

## DETROIT

Per gross ton, brokers' buying prices:

|                     |                |
|---------------------|----------------|
| No. 1 hvy. melting  | \$17.32*       |
| No. 2 hvy. melting  | 17.32*         |
| No. 1 bundles       | 17.32*         |
| New busheling       | 17.32*         |
| Flashings           | 17.32*         |
| Mach. shop turn.    | \$7.00 to 7.50 |
| Short shov. turn.   | 10.75 to 11.25 |
| Cast iron borings   | 9.75 to 10.75  |
| Mixed bor. & turn.  | 7.00 to 7.50   |
| Low phos. plate     | 19.32 to 19.52 |
| No. 1 cupola cast.  | 20.00*         |
| Charging box cast.  | 18.00 to 19.00 |
| Hvy. breakable cast | 16.50*         |
| Stove plate         | 18.50 to 19.00 |
| Automotive cast     | 20.00*         |

## PHILADELPHIA

Per gross ton delivered to consumer:

|                        |                  |
|------------------------|------------------|
| No. 1 hvy. melting     | \$17.75 to 18.25 |
| No. 2 hvy. melting     | 17.75 to 18.25   |
| No. 2 bundles          | 15.75 to 16.25   |
| Mach. shop turn.       | 9.00 to 9.50     |
| Shoveling turn.        | 10.50 to 11.50   |
| Cast iron borings      | 11.00 to 11.50   |
| Mixed bor. & turn.     | 9.00 to 9.50     |
| No. 1 cupola cast      | 20.00*           |
| Hvy. breakable cast    | 16.50*           |
| Cast, charging box     | 19.00*           |
| Hvy. axle, forge turn. | 17.00 to 17.50   |
| Low phos. plate        | 20.25 to 21.25   |
| Low phos. punchings    | 20.25 to 21.25   |
| Billet crops           | 20.25 to 21.25   |
| RR. steel wheels       | 23.25*           |
| RR. coil springs       | 23.25*           |
| RR. malleable          | 22.00*           |

## ST. LOUIS

Per gross ton delivered to consumer:

|                          |          |
|--------------------------|----------|
| Heavy melting            | \$17.50* |
| Bundled sheets           | 17.50*   |
| Mach. shop turn.         | 7.00     |
| Hvy. axle turn.          | 10.00    |
| Locomotive tires, uncut. | 17.00    |
| Misc. std. sec. rails    | 19.00*   |
| Rerolling rails          | 21.00*   |
| Steel angle bars         | 21.00*   |
| Rails 3 ft. and under    | 21.50*   |
| RR. springs              | 22.00*   |
| Steel car axles          | 23.50*   |
| Stove plate              | 19.00*   |
| Grate bars               | 15.25*   |
| Brake shoes              | 15.25*   |
| RR. malleable            | 22.00*   |
| Cast iron carwheels      | 20.00*   |
| No. 1 mach'ry cast       | 20.00*   |
| Breakable cast           | 16.50*   |

## BIRMINGHAM

Per gross ton delivered to consumer:

|                      |                 |
|----------------------|-----------------|
| No. 1 hvy. melting   | \$17.00*        |
| No. 2 hvy. melting   | 17.00*          |
| No. 2 bundles        | 17.00*          |
| No. 1 busheling      | 17.00*          |
| Long turnings        | \$9.50 to 10.00 |
| Cast iron borings    | 9.50 to 10.00   |
| Bar crops and plate  | 19.50*          |
| Structural and plate | 19.50*          |
| No. 1 cast           | 20.00*          |
| Stove plate          | 17.00           |
| Steel axles          | 18.00*          |
| Scrap rails          | 18.50           |
| Rerolling rails      | 20.50*          |
| Angles & splice bars | 20.50*          |
| Rails 3 ft. & under  | 21.00*          |
| Cast iron carwheels  | 16.50 to 17.00  |

## YOUNGSTOWN

Per gross ton delivered to consumer:

|                    |                  |
|--------------------|------------------|
| No. 1 hvy. melting | \$20.00*         |
| No. 2 hvy. melting | 20.00*           |
| Low phos. plate    | 22.50*           |
| No. 1 busheling    | 20.00*           |
| Hydraulic bundles  | 20.00*           |
| Mach. shop turn.   | \$11.50 to 12.00 |
| Short shov. turn.  | 15.00 to 15.50   |
| Cast iron borings  | 14.00 to 14.50   |

## NEW YORK

Brokers' buying prices per gross ton, on cars:

|                      |                    |
|----------------------|--------------------|
| No. 1 hvy. melting   | \$14.83 to \$15.17 |
| No. 2 hvy. melting   | 14.83 to 15.17     |
| Comp. black bundles  | 12.83 to 14.83     |
| Comp. galv. bundles  | 10.83 to 12.83     |
| Mach. shop turn.     | 6.50               |
| Mixed bor. & turn.   | 6.50               |
| Shoveling turn.      | 8.50               |
| No. 1 cupola cast.   | 20.00*             |
| Hvy. breakable cast  | 16.50*             |
| Charging box cast.   | 19.00*             |
| Stove plate          | 19.00*             |
| Clean auto cast.     | 20.00*             |
| Unstrip. motor blks. | 17.50*             |
| CI'n chem. cast bor. | 14.33*             |

## BUFFALO

Per gross ton delivered to consumer:

|                       |                  |
|-----------------------|------------------|
| No. 1 hvy. melting    | \$19.25*         |
| No. 1 bundles         | 19.25*           |
| No. 2 bundles         | 19.25*           |
| No. 2 hvy melting     | 19.25*           |
| Mach. shop turn.      | 11.00            |
| Shoveling turn.       | \$13.00 to 13.50 |
| Cast iron borings     | 12.00            |
| Mixed bor. & turn.    | 11.00            |
| No. 1 cupola cast.    | 20.00*           |
| Stove plate           | 19.00*           |
| Low phos. plate       | 21.75*           |
| Scrap rails           | 20.75*           |
| Rails 3 ft. & under   | 22.75*           |
| RR. steel wheels      | 23.75*           |
| Cast iron car wheels  | 20.00*           |
| RR. coil & leaf spgs. | 23.75*           |
| RR. knuckles & coup.  | 23.75*           |
| RR. malleable         | 22.00*           |
| No. 1 busheling       | 19.25*           |

## CLEVELAND

Per gross ton delivered to consumer:

|                                  |                  |
|----------------------------------|------------------|
| No. 1 hvy. melting               | \$19.50*         |
| No. 2 hvy. melting               | 19.50*           |
| Compressed sheet stl.            | 19.50*           |
| Drop forge flashings             | 19.00*           |
| No. 2 bundles                    | 19.50*           |
| Mach. shop turn.                 | \$10.00 to 10.50 |
| Short shov. turn.                | 14.00 to 14.50   |
| No. 1 busheling                  | 19.50*           |
| Steel axle turn.                 | 19.00*           |
| Low phos. billet and bloom crops | 24.50*           |
| Cast iron borings                | 13.00 to 13.50   |
| Mixed bor. & turn.               | 12.00 to 12.50   |
| No. 2 busheling                  | 17.00*           |
| No. 1 machine cast               | 20.00*           |
| Railroad cast                    | 20.00*           |
| Railroad grate bars              | 15.25*           |
| Stove plate                      | 19.00*           |
| RR. hvy. melting                 | 20.50*           |
| Rails 3 ft. & under              | 23.00*           |
| Rails 18 in. & under             | 24.25*           |
| Rails for rerolling              | 23.00*           |
| Railroad malleable               | 22.00*           |
| Elec. furnace punch              | 22.00*           |

## SAN FRANCISCO

Per gross ton delivered to consumer:

|                        |                  |
|------------------------|------------------|
| RR. hvy. melting       | \$16.50          |
| No. 1 hvy. melting     | 16.50            |
| No. 2 hvy. melting     | 15.00            |
| No. 2 bales            | \$13.50 to 14.25 |
| No. 3 bales            | 9.50 to 10.50    |
| Mach. shop turn.       | 7.00             |
| Elec. furn. 1 ft. und. | 15.50 to 17.00   |
| No. 1 cupola cast.     | 19.00 to 21.00   |

## LOS ANGELES

Per gross ton delivered to consumer:

|                    |                    |
|--------------------|--------------------|
| No. 1 hvy. melting | \$14.50 to \$15.50 |
| No. 2 hvy. melting | 13.50 to 14.50     |
| No. 2 bales        | 12.50 to 13.50     |
| No. 3 bales        | 9.00 to 10.00      |
| Mach. shop turn.   | 4.50               |
| No. 1 cupola cast. | 19.00 to 21.00     |

## SEATTLE

Per gross ton delivered to consumer:

|                        |         |
|------------------------|---------|
| RR. hvy. melting       | \$14.50 |
| No. 1 hvy. melting     | 14.50*  |
| No. 3 bundles          | 11.50   |
| Elec. furn. 1 ft. und. | 17.00   |
| No. 1 cupola cast.     | 20.00*  |

# Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.B. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 152-162.

| Flat Rolled Steel:           | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|------------------------------|--------------|--------------|-------------|--------------|
| (Cents Per Lb.)              | 1945         | 1945         | 1945        | 1944         |
| Hot rolled sheets.....       | 2.20         | 2.20         | 2.20        | 2.10         |
| Cold rolled sheets.....      | 3.05         | 3.05         | 3.05        | 3.05         |
| Galvanized sheets (24 ga.)   | 3.70         | 3.70         | 3.65        | 3.50         |
| Hot rolled strip.....        | 2.10         | 2.10         | 2.10        | 2.10         |
| Cold rolled strip.....       | 2.80         | 2.80         | 2.80        | 2.80         |
| Plates.....                  | 2.25         | 2.25         | 2.20        | 2.10         |
| Plates, wrought iron.....    | 3.80         | 3.80         | 3.80        | 3.80         |
| Stain's c.r. strip (No. 302) | 28.00        | 28.00        | 28.00       | 28.00        |

| Tin and Terne Plate:        | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|-----------------------------|--------------|--------------|-------------|--------------|
| (Dollars Per Base Box)      |              |              |             |              |
| Tin plate, standard cokes   | \$5.00       | \$5.00       | \$5.00      | \$5.00       |
| Tin plate, electrolytic.... | 4.50         | 4.50         | 4.50        | 4.50         |
| Special coated ternes       | 4.30         | 4.30         | 4.30        | 4.30         |

| Bars and Shapes:          | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|---------------------------|--------------|--------------|-------------|--------------|
| (Cents Per Lb.)           |              |              |             |              |
| Merchant bars.....        | 2.25         | 2.25         | 2.15        | 2.15         |
| Cold finished bars.....   | 2.65         | 2.65         | 2.65        | 2.65         |
| Alloy bars.....           | 2.70         | 2.70         | 2.70        | 2.70         |
| Structural shapes.....    | 2.10         | 2.10         | 2.10        | 2.10         |
| Stainless bars (No. 302). | 24.00        | 24.00        | 24.00       | 24.00        |
| Wrought iron bars.....    | 4.40         | 4.40         | 4.40        | 4.40         |

| Wire and Wire Products: | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|-------------------------|--------------|--------------|-------------|--------------|
| (Cents Per Lb.)         |              |              |             |              |
| Bright wire.....        | 2.75         | 2.75         | 2.60        | 2.60         |
| Wire nails.....         | 2.90         | 2.90         | 2.80        | 2.55         |

| Rails:                  | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|-------------------------|--------------|--------------|-------------|--------------|
| (Dollars Per Gross Ton) |              |              |             |              |
| Heavy rails.....        | \$43.00      | \$43.00      | \$43.00     | \$40.00      |
| Light rails.....        | 45.00        | 45.00        | 43.00       | 40.00        |

| Semi-Finished Steel:         | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|------------------------------|--------------|--------------|-------------|--------------|
| (Dollars Per Gross Ton)      |              |              |             |              |
| Rerolling billets.....       | \$36.00      | \$36.00      | \$34.00     | \$34.00      |
| Sheet bars.....              | 36.00        | 36.00        | 34.00       | 34.00        |
| Slabs, rerolling.....        | 36.00        | 36.00        | 34.00       | 34.00        |
| Forging billets.....         | 42.00        | 42.00        | 40.00       | 40.00        |
| Alloy blooms, billets, slabs | 54.00        | 54.00        | 54.00       | 54.00        |

| Wire Rods and Skelp: | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|----------------------|--------------|--------------|-------------|--------------|
| (Cents Per Lb.)      |              |              |             |              |
| Wire rods.....       | 2.15         | 2.15         | 2.00        | 2.00         |
| Skelp.....           | 1.90         | 1.90         | 1.90        | 1.90         |

Latest steel price increase, Amendment 13 to RPS6, effective May 23, 1945.

| Pig Iron:                   | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|-----------------------------|--------------|--------------|-------------|--------------|
| (Per Gross Ton)             |              |              |             |              |
| No. 2 fdy., Philadelphia... | \$26.84      | \$26.84      | \$26.84     | \$25.84      |
| No. 2, Valley furnace....   | 25.00        | 25.00        | 25.00       | 24.00        |
| No. 2, Southern, Cin'ti.... | 26.11        | 26.11        | 26.11       | 25.11        |
| No. 2, Birmingham.....      | 21.38        | 21.38        | 21.38       | 20.38        |
| No. 2, foundry, Chicago†.   | 25.00        | 25.00        | 25.00       | 24.00        |
| Basic, del'd eastern Pa.... | 26.34        | 26.34        | 26.34       | 25.34        |
| Basic, Valley furnace....   | 24.50        | 24.50        | 24.50       | 23.50        |
| Malleable, Chicago†.....    | 25.00        | 25.00        | 25.00       | 24.00        |
| Malleable, Valley.....      | 25.00        | 25.00        | 25.00       | 24.00        |
| L. S. charcoal, Chicago*.   | 42.34        | 42.34        | 42.34       | 37.34        |
| Ferromanganese†.....        | 135.00       | 135.00       | 135.00      | 135.00       |

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

‡ For carlots at seaboard.

Last pig iron price change authorized by OPA effective Feb. 14, 1945.

\* Charcoal price increase retroactive to March 7, on contracts to Feb. 13.

| Scrap:                      | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|-----------------------------|--------------|--------------|-------------|--------------|
| (Per Gross Ton)             |              |              |             |              |
| Heavy melt'g steel, P'gh.   | \$20.00      | \$20.00      | \$20.00     | \$20.00      |
| Heavy melt'g steel, Phila.  | 18.00        | 18.00        | 18.75       | 18.75        |
| Heavy melt'g steel, Ch'go   | 18.75        | 18.75        | 18.75       | 18.75        |
| No. 1 hy. comp. sheet, Det. | 17.32        | 17.32        | 17.32       | 17.35        |
| Low phos. plate, Youngs'n   | 22.50        | 22.50        | 22.50       | 22.50        |
| No. 1 cast, Pittsburgh...   | 20.00        | 20.00        | 20.00       | 20.00        |
| No. 1 cast, Philadelphia.   | 20.00        | 20.00        | 20.00       | 20.00        |
| No. 1 cast, Chicago.....    | 20.00        | 20.00        | 20.00       | 20.00        |

| Coke, Connellsville:    | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|-------------------------|--------------|--------------|-------------|--------------|
| (Per Net Ton at Oven)   |              |              |             |              |
| Furnace coke, prompt... | \$7.50       | \$7.00       | \$7.00      | \$7.00       |
| Foundry coke, prompt... | 9.00         | 8.25         | 8.25        | 8.25         |

| Non-Ferrous Metals:             | June 5, 1945 | May 29, 1945 | May 1, 1945 | June 6, 1944 |
|---------------------------------|--------------|--------------|-------------|--------------|
| (Cents Per Lb. to Large Buyers) |              |              |             |              |
| Copper, electro., Conn....      | 12.00        | 12.00        | 12.00       | 12.00        |
| Copper, Lake.....               | 12.00        | 12.00        | 12.00       | 12.00        |
| Tin (Straits), New York.        | 52.00        | 52.00        | 52.00       | 52.00        |
| Zinc, East St. Louis.....       | 8.25         | 8.25         | 8.25        | 8.25         |
| Lead, St. Louis.....            | 6.35         | 6.35         | 6.35        | 6.35         |
| Aluminum, Virgin, del'd..       | 15.00        | 15.00        | 15.00       | 15.00        |
| Nickel, electrolytic.....       | 35.00        | 35.00        | 35.00       | 35.00        |
| Magnesium, ingot.....           | 20.50        | 20.50        | 20.50       | 20.50        |
| Antimony, Laredo, Tex...        | 14.50        | 14.50        | 14.50       | 14.50        |

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

# Composite Prices . .

| FINISHED STEEL     | June 5, 1945        |
|--------------------|---------------------|
| One week ago.....  | 2.41571c. a Lb..... |
| One month ago..... | 2.38444c. a Lb..... |
| One year ago.....  | 2.30329c. a Lb..... |

| HIGH                         | LOW                |
|------------------------------|--------------------|
| 1945..... 2.41571c., May 29  | 2.21189c., Jan. 2  |
| 1944..... 2.30837c., Sept. 5 | 2.21189c., Oct. 5  |
| 1943..... 2.25513c.          | 2.25513c.          |
| 1942..... 2.26190c.          | 2.26190c.          |
| 1941..... 2.43078c.          | 2.43078c.          |
| 1940..... 2.30467c., Jan. 2  | 2.24107c., Apr. 16 |
| 1939..... 2.35367c., Jan. 3  | 2.26689c., May 16  |
| 1938..... 2.58414c., Jan. 4  | 2.27207c., Oct. 18 |
| 1937..... 2.58414c., Mar. 9  | 2.32263c., Jan. 4  |
| 1936..... 2.32263c., Dec. 28 | 2.05200c., Mar. 10 |
| 1935..... 2.07642c., Oct. 1  | 2.06492c., Jan. 8  |
| 1934..... 2.15367c., Apr. 24 | 1.95757c., Jan. 2  |
| 1933..... 1.95578c., Oct. 3  | 1.75836c., May 2   |
| 1932..... 1.89196c., July 5  | 1.83901c. Mar. 1   |
| 1931..... 1.99626c., Jan. 13 | 1.86586c., Dec. 29 |
| 1930..... 2.25488c., Jan. 7  | 1.97319c., Dec. 9  |
| 1929..... 2.31773c., May 28  | 2.26498c., Oct. 29 |

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 23, 1941, issue.

| FIG IRON           | June 5, 1945             |
|--------------------|--------------------------|
| One week ago.....  | \$24.61 a Gross Ton..... |
| One month ago..... | \$24.61 a Gross Ton..... |
| One year ago.....  | \$23.61 a Gross Ton..... |

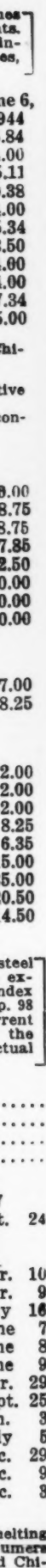
| HIGH             | LOW             |
|------------------|-----------------|
| \$24.61, Feb. 20 | \$23.61, Jan. 2 |
| \$23.61          | \$23.61         |
| \$23.61          | \$23.61         |
| \$23.61          | \$23.61         |
| \$23.61, Mar. 20 | \$23.45, Jan. 2 |
| \$23.45, Dec. 23 | 22.61, Jan. 2   |
| 22.61, Sept. 19  | 20.61, Sept. 12 |
| 23.25, June 21   | 19.61, July 6   |
| 23.25, Mar. 9    | 20.25, Feb. 16  |
| 19.74, Nov. 24   | 18.73, Aug. 11  |
| 18.84, Nov. 5    | 17.83, May 14   |
| 17.90, May 1     | 16.90, Jan. 27  |
| 16.90, Dec. 5    | 13.56, Jan. 3   |
| 14.81, Jan. 5    | 13.56, Dec. 6   |
| 15.90, Jan. 6    | 14.79, Dec. 15  |
| 18.21, Jan. 7    | 15.90, Dec. 16  |
| 18.71, May 14    | 13.21, Dec. 17  |

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

| SCRAP STEEL        | June 5, 1945             |
|--------------------|--------------------------|
| One week ago.....  | \$18.92 a Gross Ton..... |
| One month ago..... | \$18.92 a Gross Ton..... |
| One year ago.....  | \$19.17 a Gross Ton..... |

| HIGH            | LOW              |
|-----------------|------------------|
| \$19.17         | \$19.17          |
| 19.17           | \$15.67, Oct. 24 |
| 19.17           | 19.17            |
| 19.17           | 19.17            |
| \$22.00, Jan. 7 | \$19.17, Apr. 10 |
| 21.83, Dec. 30  | 16.04, Apr. 9    |
| 22.50, Oct. 3   | 14.08, May 16    |
| 15.00, Nov. 22  | 11.00, June 7    |
| 21.92, Mar. 30  | 12.67, June 8    |
| 17.75, Dec. 21  | 12.67, June 9    |
| 13.42, Dec. 10  | 10.33, Apr. 29   |
| 13.00, Mar. 13  | 9.50, Sept. 25   |
| 12.25, Aug. 8   | 6.75, Jan. 3     |
| 8.50, Jan. 12   | 6.43, July 5     |
| 11.33, Jan. 6   | 8.50, Dec. 29    |
| 15.00, Feb. 18  | 11.25, Dec. 9    |
| 17.58, Jan. 29  | 14.08, Dec. 3    |

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.



## THE IRON AGE, June 7, 1945—151



# Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 29,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (12) Boxed. (13) Portland and Seattle price, San Francisco 2.50c. (14) This base price for annealed, bright finish wires, commercial spring wire. (15) Produced to dimensional tolerances in AISI Manual Sect. 6. For price exceptions to finished and semi-finished steels turn two pages.

| Basing Point<br>Product           | DELIVERED TO                                          |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
|-----------------------------------|-------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------|----------------|-----------------|---------------------|-----------------|------------------------|--------------------------------------|----------------------------------|------------------------|---------------------------------|---------|-------------|-------------------|
|                                   | Pitts-<br>burgh                                       | Chicago                                               | Gary                                                  | Cleve-<br>land | Birm-<br>ingham | Buffalo             | Youngs-<br>town | Spar-<br>rows<br>Point | Granite<br>City                      | Middle-<br>town,<br>Ohio         | Gulf<br>Ports,<br>Cars | 10<br>Pacific<br>Ports,<br>Cars | Detroit | New<br>York | Phila-<br>delphia |
| <b>SHEETS</b>                     |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Hot rolled                        | 2.20¢                                                 | 2.20¢                                                 | 2.20¢                                                 | 2.20¢          | 2.20¢           | 2.20¢               | 2.20¢           | 2.20¢                  | 2.30¢                                | 2.20¢                            |                        | 2.75¢                           | 2.30¢   | 2.44¢       | 2.37¢             |
| Cold rolled <sup>1</sup>          | 3.05¢                                                 | 3.05¢                                                 | 3.05¢                                                 | 3.05¢          |                 | 3.05¢               | 3.05¢           |                        | 3.15¢                                | 3.05¢                            |                        | 3.70¢                           | 3.15¢   | 3.39¢       | 3.37¢             |
| Galvanized (24 gage)              | 3.70¢                                                 | 3.70¢                                                 | 3.70¢                                                 |                | 3.70¢           | 3.70¢               | 3.70¢           | 3.70¢                  | 3.80¢                                | 3.70¢                            |                        | 4.25¢                           |         | 3.94¢       | 3.87¢             |
| Enameling (20 gage)               | 3.45¢                                                 | 3.45¢                                                 | 3.45¢                                                 | 3.45¢          |                 |                     | 3.45¢           |                        | 3.55¢                                | 3.45¢                            |                        | 4.10¢                           | 3.55¢   | 3.81¢       | 3.77¢             |
| Long ternes <sup>2</sup>          | 3.80¢                                                 | 3.80¢                                                 | 3.80¢                                                 |                |                 |                     |                 |                        |                                      |                                  |                        | 4.55¢                           |         | 4.16¢       | 4.12¢             |
| <b>STRIP</b>                      |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Hot rolled <sup>3</sup>           | 2.10¢                                                 | 2.10¢                                                 | 2.10¢                                                 | 2.10¢          | 2.10¢           |                     | 2.10¢           |                        |                                      | 2.10¢                            |                        | 2.75¢                           | 2.20¢   | 2.46¢       |                   |
| Cold rolled <sup>4</sup>          | 2.80¢                                                 | 2.90¢                                                 |                                                       | 2.80¢          |                 |                     | 2.80¢           |                        | (Worcester=3.00¢)                    |                                  |                        |                                 | 2.90¢   | 3.16¢       |                   |
| Cooperage stock                   | 2.20¢                                                 | 2.20¢                                                 |                                                       |                | 2.20¢           |                     | 2.20¢           |                        |                                      |                                  |                        |                                 |         | 2.56¢       |                   |
| Commodity C-R                     | 2.95¢                                                 | 3.05¢                                                 |                                                       | 2.95¢          |                 |                     | 2.95¢           |                        | (Worcester=3.35¢)                    |                                  |                        |                                 | 3.05¢   | 3.31¢       |                   |
| <b>TIN PLATE</b>                  |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Standard sokes, base box          | \$5.00                                                | \$5.00                                                | \$5.00                                                |                |                 |                     |                 |                        | \$5.10                               |                                  |                        |                                 |         | 5.36¢       | 5.32¢             |
| Electro, box                      | 0.25 lb. \$4.35<br>0.50 lb. \$4.50<br>0.75 lb. \$4.65 | 0.25 lb. \$4.35<br>0.50 lb. \$4.50<br>0.75 lb. \$4.65 | 0.25 lb. \$4.35<br>0.50 lb. \$4.50<br>0.75 lb. \$4.65 |                |                 |                     |                 |                        | \$4.60<br>\$4.75                     |                                  |                        |                                 |         |             |                   |
| <b>BLACK PLATE</b>                |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| 29 gage <sup>5</sup>              | 3.05¢                                                 | 3.05¢                                                 | 3.05¢                                                 |                |                 |                     |                 |                        | 3.15¢                                |                                  |                        | 4.05¢ <sup>12</sup>             |         |             | 3.37¢             |
| <b>TERNES, MFG.</b>               |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Special coated, base box          | \$4.30                                                | \$4.30                                                | \$4.30                                                |                |                 |                     |                 |                        | \$4.40                               |                                  |                        |                                 |         |             |                   |
| <b>BARS</b>                       |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Carbon steel                      | 2.25¢                                                 | 2.25¢                                                 | 2.25¢                                                 | 2.25¢          | 2.25¢           | 2.25¢               |                 |                        | (Duluth=2.35¢)                       |                                  | 2.60¢                  | 2.90¢                           | 2.35¢   | 2.59¢       | 2.57¢             |
| Rail steel <sup>6</sup>           | 2.25¢                                                 | 2.25¢                                                 | 2.25¢                                                 | 2.25¢          | 2.25¢           | 2.25¢               |                 |                        |                                      |                                  | 2.60¢                  | 2.90¢                           |         |             |                   |
| Reinforcing (billet) <sup>7</sup> | 2.15¢                                                 | 2.15¢                                                 | 2.15¢                                                 | 2.15¢          | 2.15¢           | 2.15¢               | 2.15¢           | 2.15¢                  |                                      |                                  | 2.50¢                  | 2.55¢ <sup>13</sup>             | 2.25¢   | 2.39¢       |                   |
| Reinforcing (rail) <sup>7</sup>   | 2.15¢                                                 | 2.15¢                                                 | 2.15¢                                                 | 2.15¢          | 2.15¢           | 2.15¢               | 2.15¢           | 2.15¢                  |                                      |                                  | 2.50¢                  | 2.55¢ <sup>13</sup>             | 2.25¢   |             | 2.47¢             |
| Cold finished <sup>8</sup>        | 2.65¢                                                 | 2.65¢                                                 | 2.65¢                                                 | 2.65¢          |                 | 2.65¢               |                 |                        | (Detroit=2.70¢)                      | (Toledo=2.80¢)                   |                        |                                 |         | 2.99¢       | 2.97¢             |
| Alloy, hot rolled                 | 2.70¢                                                 | 2.70¢                                                 |                                                       |                |                 | 2.70¢               |                 |                        | (Bethlehem, Massillon, Canton=2.70¢) |                                  |                        |                                 | 2.80¢   |             |                   |
| Alloy, cold drawn                 | 3.35¢                                                 | 3.35¢                                                 | 3.35¢                                                 | 3.35¢          |                 | 3.35¢               |                 |                        |                                      |                                  |                        |                                 | 3.45¢   |             |                   |
| <b>PLATES</b>                     |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Carbon steel <sup>10</sup>        | 2.25¢                                                 | 2.25¢                                                 | 2.25¢                                                 | 2.25¢          | 2.25¢           |                     | 2.25¢           | 2.25¢                  | 2.50¢                                | (Coatesville and Claymont=2.25¢) | 2.60¢                  | 2.80¢                           | 2.47¢   | 2.44¢       | 2.30¢             |
| Floor plates                      | 3.50¢                                                 | 3.50¢                                                 |                                                       |                |                 |                     |                 |                        |                                      |                                  | 3.85¢                  | 4.15¢                           |         | 3.96¢       | 3.82¢             |
| Alloy                             | 3.50¢                                                 | 3.50¢                                                 |                                                       |                |                 | (Coatesville=3.50¢) |                 |                        |                                      |                                  | 3.95¢                  | 4.15¢                           |         | 3.70¢       | 3.59¢             |
| <b>SHAPES</b>                     |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Structural                        | 2.10¢                                                 | 2.10¢                                                 | 2.10¢                                                 |                | 2.10¢           | 2.10¢               |                 |                        | (Bethlehem=2.10¢)                    |                                  | 2.45¢                  | 2.75¢                           |         | 2.27¢       | 2.21¢             |
| <b>SPRING STEEL, C-R</b>          |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| 0.26 to 0.50 Carbon               | 2.80¢                                                 |                                                       |                                                       | 2.80¢          |                 |                     |                 |                        | (Worcester=3.00¢)                    |                                  |                        |                                 |         |             |                   |
| 0.51 to 0.75 Carbon               | 4.30¢                                                 |                                                       |                                                       | 4.30¢          |                 |                     |                 |                        | (Worcester=4.50¢)                    |                                  |                        |                                 |         |             |                   |
| 0.76 to 1.00 Carbon               | 6.15¢                                                 |                                                       |                                                       | 6.15¢          |                 |                     |                 |                        | (Worcester=6.35¢)                    |                                  |                        |                                 |         |             |                   |
| 1.01 to 1.25 Carbon               | 8.35¢                                                 |                                                       |                                                       | 8.35¢          |                 |                     |                 |                        | (Worcester=8.55¢)                    |                                  |                        |                                 |         |             |                   |
| <b>WIRE</b>                       |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Bright <sup>14</sup>              | 2.75¢                                                 | 2.75¢                                                 |                                                       | 2.75¢          | 2.75¢           |                     |                 |                        | (Worcester=2.85¢)                    | (Duluth=2.80¢)                   | 3.25¢                  |                                 |         |             | 3.07¢             |
| Galvanized                        |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Spring (High Carbon)              | 3.35¢                                                 | 3.35¢                                                 |                                                       | 3.35¢          |                 |                     |                 |                        | (Worcester=3.45¢)                    |                                  |                        | 3.85¢                           |         |             | 3.67¢             |
| <b>PILING</b>                     |                                                       |                                                       |                                                       |                |                 |                     |                 |                        |                                      |                                  |                        |                                 |         |             |                   |
| Steel Sheet                       | 2.40¢                                                 | 2.40¢                                                 |                                                       |                |                 | 2.40¢               |                 |                        |                                      |                                  |                        | 2.95¢                           |         |             | 2.72¢             |

## SEMI-FINISHED STEEL

**Ingots, Carbon, Re-rolling**  
Base per gross ton, f.o.b. mill.... \$31.00

**Ingots, Carbon, Forging**  
Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown ..... \$36.00

**Ingots, Alloy**  
Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh ..... \$45.00

## Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (re-rolling only). Prices delivered Detroit are \$2.00 higher; delivered E. Michigan, \$3 higher; f.o.b. Duluth, billets only, \$2.00 higher; billets f.o.b. Pacific ports are \$12 higher. Provo, \$11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

Re-rolling ..... Per Gross Ton \$36.00  
Forging quality ..... 42.00

## Alloy Billets, Blooms, Slabs

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton ..... \$54.00  
Price delivered Detroit \$2.00 higher; East Michigan, \$3.00 higher.

## Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.  
Open hearth or bessemer ..... Per Gross Ton \$36.00

## PRICES

**kelp**  
Pittsburgh, Chicago, Youngstown,  
Coatesville, Pa., Sparrows Point, Md.  
Per Lb.  
grooved, universal and sheared .. 1.90c.

### Wire Rods

(No. 5 to 9/32 in.)

Per Lb.  
Pittsburgh, Chicago, Cleveland... 2.15c.  
Worcester, Mass. .... 2.25c.  
Birmingham .... 2.15c.  
San Francisco .... 2.65c.  
Galveston .... 2.40c.  
9/32 in. to 47/64 in., 0.15c. a lb. higher.  
Quantity extras apply.

### Shell Steel

Per Gross Ton  
3 in. to 12 in. .... \$52.00  
12 in. to 18 in. .... 54.00  
18 in. and over .... 56.00  
Basic open hearth shell steel, f.o.b.  
Pittsburgh, Chicago, Buffalo, Gary, Cleve-  
land, Youngstown and Birmingham.  
Prices delivered Detroit are \$2.00  
higher; East Michigan, \$3 higher.  
Price Exceptions: Follansbee Steel  
Corp. permitted to sell at \$13.00 per gross  
ton, f.o.b. Toronto, Ohio, above base  
price of \$52.00.

Note: The above base prices apply on  
lots of 1000 tons of a size and section to  
which are to be added extras for chemical  
requirements, cutting, or quantity.

### RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb.,  
No. 1 O.H., gross ton .... \$43.00  
Angle splice bars, 100 lb. .... 2.70  
F.o.b. Basing Points) Per Gross Ton  
Light rails (from billets) .... \$45.00  
Light rails (from rail steel) .... 39.00  
Base per Lb.  
Cut spikes .... 3.25c.  
Screw spikes .... 5.40c.  
Tie plate, steel .... 2.30c.  
Tie plates, Pacific Coast .... 2.45c.  
Track bolts .... 4.75c.  
Track bolts, heat treated, to rail-  
roads .... 5.00c.  
Track bolts, jobbers discount .... 63-5  
Basing points, light rails, Pittsburgh,  
Chicago, Birmingham; cut spikes and tie  
plates—Pittsburgh, Chicago, Portsmouth,  
Ohio, Weirton, W. Va., St. Louis, Kansas  
City, Minnequa, Colo., Birmingham and  
Pacific Coast ports; tie plates alone—  
Steelton, Pa., Buffalo. Cut spikes alone—  
Youngstown, Lebanon, Pa., Richmond,  
Oregon and Washington ports, add 25c.

### TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)  
Base per lb.

High speed .... 67c.  
Straight molybdenum .... 54c.  
Tungsten-molybdenum .... 57 1/2 c.  
High-carbon-chromium .... 43c.  
Oil hardening .... 24c.  
Special carbon .... 22c.  
Extra carbon .... 18c.  
Regular carbon .... 14c.  
Warehouse prices east of Mississippi  
are 2c. a lb. higher; west of Mississippi  
3c. higher.

### WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago,  
Cleveland, Birmingham, Duluth

|                           | Basing<br>Points | Pacific<br>Coast<br>Basing<br>Points |
|---------------------------|------------------|--------------------------------------|
| Standard wire nails...    | \$2.90           | \$3.40                               |
| Coated nails .....        | 2.90             | 3.40                                 |
| Cut nails, carloads ...   | 3.85             | ...                                  |
| Annealed fence wire...    | \$3.05           | \$3.55                               |
| Annealed galv. fence wire | 3.40             | 3.90                                 |
| Base Column               |                  |                                      |
| Woven wire fence* ....    | 67               | 86                                   |
| Fence posts, carloads..   | 69               | 91                                   |
| Single loop bale ties..   | 66               | 87                                   |
| Galvanized barbed wire**  | 72               | ...                                  |
| Twisted barless wire..    | 72               | ...                                  |

\*15 1/4 gage and heavier. \*\*On 80-rod  
spools in carload quantities.  
†Prices subject to switching or trans-  
portation charges.



## 8 FEATURES

in every Shepard Niles  
Hoist...whatever the size

- 1 Balanced Drive gearing—all moving parts revolve about a common axis, balancing all stresses.
- 2 Permanent alignment.
- 3 Antifriction bearings.
- 4 Automatic oil-bath lubrication.
- 5 Dust and moisture-proof enclosures.
- 6 Motors specially designed for hoist service.
- 7 Precision control—push button, pendant drop or remote.
- 8 High speeds—long lifts.

High efficiency—quiet operation—greatest possible safety and durability.

Consult the Shepard Niles representative in your nearest war-production center or write directly to the home office for information on any load-lifting or moving problem.

# Shepard Niles

## CRANE & HOIST CORPORATION

356 SCHUYLER AVE. • MONTAUR FALLS, N.Y.

# PRICES

## WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

| Cities         | SHEETS                     |                |                         | STRIP         |                | Plates<br>1/4 in.<br>and<br>heavier | Structural<br>Shapes | BARS          |                  | ALLOY BARS                   |                                      |                              |                                      |
|----------------|----------------------------|----------------|-------------------------|---------------|----------------|-------------------------------------|----------------------|---------------|------------------|------------------------------|--------------------------------------|------------------------------|--------------------------------------|
|                | Hot<br>Rolled<br>(10 gage) | Cold<br>Rolled | Galvanized<br>(24 gage) | Hot<br>Rolled | Cold<br>Rolled |                                     |                      | Hot<br>Rolled | Cold<br>Finished | Hot<br>Rolled,<br>NE 8617-20 | Hot<br>Rolled,<br>NE 9442-45<br>Ann. | Cold<br>Drawn,<br>NE 8617-20 | Cold<br>Drawn,<br>NE 9442-45<br>Ann. |
| **Philadelphia | \$3.518                    | \$4.872*       | \$5.158a                | \$3.922       | \$4.772        | \$3.605                             | \$3.666              | \$3.822       | \$4.072          | \$5.966                      | \$7.066                              | \$7.272                      | \$8.322                              |
| New York       | 3.59                       | 4.813*         | 5.110                   | 3.974*        | 4.772          | 3.768                               | 3.758                | 3.853         | 4.103            | 5.858                        | 6.908                                | 7.103                        | 8.203                                |
| Boston         | 3.744                      | 4.744*         | 5.224*                  | 4.106         | 4.715          | 3.912                               | 3.912                | 4.044         | 4.144            | 6.162                        | 7.282                                | 7.344                        | 8.394                                |
| Baltimore      | 3.394                      | 4.852          | 4.894                   | 3.902         | 4.752          | 3.594                               | 3.759                | 3.802         | 4.052            |                              |                                      |                              |                                      |
| Norfolk        | 3.771                      | 4.965          | 5.371                   | 4.165         | 4.865          | 3.971                               | 4.002                | 4.065         | 4.165            |                              |                                      |                              |                                      |
| Chicago        | 3.25                       | 4.20           | 5.231                   | 3.60          | 4.651*         | 3.55                                | 3.55                 | 3.50          | 3.75             | 5.75                         | 6.85                                 | 6.85                         | 7.90                                 |
| Milwaukee      | 3.387                      | 4.337*         | 5.272*                  | 3.737         | 4.7871*        | 3.687                               | 3.687                | 3.637         | 3.887            | 5.987                        | 7.087                                | 7.087                        | 8.137                                |
| Cleveland      | 3.35                       | 4.40           | 4.877*                  | 3.60          | 4.45           | 3.40                                | 3.588                | 3.35          | 3.75             | 5.956                        | 7.056                                | 6.85                         | 7.90                                 |
| Buffalo        | 3.35                       | 4.40           | 4.75*                   | 3.819         | 4.669          | 3.63                                | 3.40                 | 3.35          | 3.75             | 5.75                         | 6.85                                 | 6.85                         | 7.90                                 |
| Detroit        | 3.45                       | 4.50           | 5.00*                   | 3.70          | 4.6591*        | 3.609                               | 3.661                | 3.45          | 3.80             | 6.08                         | 7.18                                 | 7.159                        | 8.208                                |
| Cincinnati     | 3.425                      | 4.475*         | 4.825*                  | 3.675         | 4.711          | 3.611                               | 3.691                | 3.811         | 4.011            |                              |                                      |                              |                                      |
| St. Louis      | 3.397                      | 4.347*         | 5.172*                  | 3.747         | 4.8311*        | 3.697                               | 3.697                | 3.647         | 4.031            | 6.131                        | 7.231                                | 7.231                        | 8.281                                |
| Pittsburgh     | 3.35                       | 4.40           | 4.75                    | 3.60          | 4.45           | 3.40                                | 3.40                 | 3.35          | 3.75             | 5.75                         | 6.85                                 | 6.85                         | 7.90                                 |
| St. Paul       | 3.51                       | 4.48           | 5.257*                  | 3.86          | 4.351*         | 3.811*                              | 3.811*               | 3.761*        | 4.361            | 6.09                         | 7.19                                 | 7.061                        | 8.711                                |
| Omaha          | 3.865                      | 5.443          | 5.608*                  | 4.215         | 4.165          | 4.165                               | 4.165                | 4.115         | 4.43             |                              |                                      |                              |                                      |
| Indianapolis   | 3.518                      | 4.568          | 4.548                   | 3.768         | 4.741          | 3.63                                | 3.63                 | 3.58          | 3.96             | 6.08                         | 7.18                                 | 7.18                         | 8.23                                 |
| Birmingham     | 3.45                       | 4.75           | 4.75                    | 3.70          |                | 3.55                                | 3.55                 | 3.50          | 4.43             |                              |                                      |                              |                                      |
| Memphis        | 3.965*                     | 4.66           | 3.265                   | 4.215         |                | 4.065                               | 4.065                | 4.015         | 4.33             |                              |                                      |                              |                                      |
| New Orleans    | 4.058*                     | 4.95           | 5.359                   | 4.308         |                | 4.158                               | 4.158*               | 4.108*        | 4.629            |                              |                                      |                              |                                      |
| Houston        | 3.763                      | 5.573          | 6.313*                  | 4.313         |                | 4.25                                | 4.25                 | 3.75          | 4.373*           | 7.223                        | 8.323                                | 8.323                        | 9.373                                |
| Los Angeles    | 4.10                       | 7.20*          | 6.10*                   | 4.95          | 8.6131*        | 4.95                                | 4.65                 | 4.40          | 5.583            | 8.304                        | 9.404                                | 9.404                        | 10.454                               |
| San Francisco  | 4.551*                     | 7.30*          | 6.35*                   | 4.501*        | 7.3331*        | 4.651*                              | 4.351*               | 4.151*        | 5.333            | 8.304                        | 9.404                                | 9.404                        | 10.454                               |
| Seattle        | 4.651*                     | 7.05*          | 5.95*                   | 4.251*        |                | 4.751*                              | 4.451*               | 4.351*        | 5.783            |                              | 9.404                                |                              |                                      |
| Portland       | 4.651*                     | 8.60*          | 5.75*                   | 4.751*        |                | 4.851*                              | 4.451*               | 4.451*        | 5.533            | 8.304                        | 9.404                                | 8.304                        | 9.404                                |
| Salt Lake City | 4.5301*                    |                | 6.171*                  | 5.531*        |                | 4.981*                              | 4.981*               | 4.881*        | 5.90             |                              |                                      |                              |                                      |

## National Emergency Steels MILL EXTRAS

| Designa-<br>tion | Basic Open-Hearth     |                                  | Electric Furnace      |                                  | Designa-<br>tion | Basic Open-Hearth     |                                  | Electric Furnace      |                                  |
|------------------|-----------------------|----------------------------------|-----------------------|----------------------------------|------------------|-----------------------|----------------------------------|-----------------------|----------------------------------|
|                  | Bars and<br>Bar-Strip | Billets,<br>Blooms,<br>and Slabs | Bars and<br>Bar-Strip | Billets,<br>Blooms,<br>and Slabs |                  | Bars and<br>Bar-Strip | Billets,<br>Blooms,<br>and Slabs | Bars and<br>Bar-Strip | Billets,<br>Blooms,<br>and Slabs |
| NE 8612          | 0.65¢                 | \$13.00                          | \$1.15                | \$23.00                          | NE 9427          | 0.75¢                 | \$15.00                          | \$1.25                | \$25.00                          |
| NE 8616          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9430          | 0.75                  | 15.00                            | 1.25                  | 25.00                            |
| NE 8617          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9432          | 0.75                  | 15.00                            | 1.25                  | 25.00                            |
| NE 8620          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9435          | 0.75                  | 15.00                            | 1.25                  | 25.00                            |
| NE 8622          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9437          | 0.75                  | 15.00                            | 1.25                  | 25.00                            |
| NE 8625          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9440          | 0.75                  | 15.00                            | 1.25                  | 25.00                            |
| NE 8627          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9442          | 0.80                  | 16.00                            | 1.30                  | 26.00                            |
| NE 8630          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9445          | 0.80                  | 16.00                            | 1.30                  | 26.00                            |
| NE 8632          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9447          | 0.80                  | 16.00                            | 1.30                  | 26.00                            |
| NE 8635          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9450          | 0.80                  | 16.00                            | 1.30                  | 26.00                            |
| NE 8637          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |                  |                       |                                  |                       |                                  |
| NE 8640          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9722          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8642          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9727          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8645          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9732          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8647          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9737          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8650          | 0.65                  | 13.00                            | 1.15                  | 23.00                            | NE 9742          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
|                  |                       |                                  |                       |                                  | NE 9745          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8712          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9747          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8716          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9750          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8717          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9763          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8720          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9768          | 0.65                  | 13.00                            | 1.15                  | 23.00                            |
| NE 8722          | 0.70                  | 14.00                            | 1.20                  | 24.00                            |                  |                       |                                  |                       |                                  |
| NE 8725          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9830          | \$1.30                | 26.00                            | 1.80                  | 36.00                            |
| NE 8727          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9832          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8730          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9835          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8732          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9837          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8735          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9840          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8737          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9842          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8740          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9845          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8742          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9847          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8745          | 0.70                  | 14.00                            | 1.20                  | 24.00                            | NE 9850          | 1.30                  | 26.00                            | 1.80                  | 36.00                            |
| NE 8747          | 0.70                  | 14.00                            | 1.20                  | 24.00                            |                  |                       |                                  |                       |                                  |
| NE 8750          | 0.70                  | 14.00                            | 1.20                  | 24.00                            |                  |                       |                                  |                       |                                  |
|                  |                       |                                  |                       |                                  | NE 9912          | 1.20                  | 24.00                            | 1.55                  | 31.00                            |
| NE 9415          | 0.75                  | 15.00                            | 1.25                  | 25.00                            | NE 9915          | 1.20                  | 24.00                            | 1.55                  | 31.00                            |
| NE 9417          | 0.75                  | 15.00                            | 1.25                  | 25.00                            | NE 9917          | 1.20                  | 24.00                            | 1.55                  | 31.00                            |
| NE 9420          | 0.75                  | 15.00                            | 1.25                  | 25.00                            | NE 9920          | 1.20                  | 24.00                            | 1.55                  | 31.00                            |
| NE 9422          | 0.75                  | 15.00                            | 1.25                  | 25.00                            | NE 9922          | 1.20                  | 24.00                            | 1.55                  | 31.00                            |
| NE 9425          | 0.75                  | 15.00                            | 1.25                  | 25.00                            | NE 9925          | 1.20                  | 24.00                            | 1.55                  | 31.00                            |

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under, with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and \$5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of \$2.70 for 100 lb. on finished products and \$54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

## BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base; NE alloy bars, 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(\*) Philadelphia: Galvanized sheet, 25 or more bundles. Extra for size, quality, etc., apply on above quotations.

\*Add 0.271c. for sizes not rolled in Birmingham.

\*\*City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

## LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports\*)

|                                | Per Gross Ton |
|--------------------------------|---------------|
| Old range, bessemer, 51.50     | \$4.75        |
| Old range, non-bessemer, 51.50 | 4.60          |
| Mesaba, bessemer, 51.50        | 4.60          |
| Mesaba, non-bessemer, 51.50    | 4.45          |
| High phosphorus, 51.50         | 4.35          |

\*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

## FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

### Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

| Effective CaF <sub>2</sub> Content: | Base price per short ton |
|-------------------------------------|--------------------------|
| 70% or more                         | \$33.00                  |
| 65% but less than 70%               | 32.00                    |
| 60% but less than 65%               | 31.00                    |
| Less than 60%                       | 30.00                    |



Cold  
rawn,  
9442-45  
Ann.

3.322  
3.203  
3.394

7.90  
1.137  
7.90  
7.90  
1.208

1.281  
1.90  
1.711

1.23

1.373  
1.484  
1.484

1.404

OW

Shapes

lb.:  
10 lb.

150  
50 to  
19 lb.

(9)  
(11)  
(13)  
(15)

over.  
over.  
5 or

above

ning-

leable  
point  
call-

ered

Ton

4.75  
4.60  
4.60

4.45  
4.35

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Official U. S. Navy Photograph

**A RUBBER COMPANY IN  
NORTH CAROLINA IS**

***HELPING FIRE THESE GUNS!***

*A leak in the fleet's air umbrella. Jap planes sneaking through head straight for our aircraft carriers. Suddenly, a barrage of fire from every ship, including the flat-tops themselves. Few enemy planes cause damage, if any. Few, if any, get home!*

In action like this, a rubber company in North Carolina can be credited with helping to fire the guns. For, at its Navy-owned Charlotte plant, U. S. Rubber is stretching production of the shells used by the Navy's 40 mm. anti-aircraft cannon to the very limit. And one means they're using with outstanding success is spray finishing with DeVilbiss Automatic Spray Machines.

A DeVilbiss two-gun automatic system sprays the

shells—first outside, then inside—at the rate of *one a second*. At another DeVilbiss dual-gun spray station fuse bodies are painted an all-over white. Then after collars are put on, the tips are painted an identifying green—at the rate of *154 a minute*.

DeVilbiss Spray Systems—both automatic and manual—are today helping countless other firms to fill vital war needs *faster*. And these same efficient DeVilbiss systems will be available for painting and coating your peacetime products. Get all the facts from a DeVilbiss engineer *before* completing your postwar plans!

**THE DEVILBISS COMPANY, TOLEDO 1, OHIO**

Canadian Plant: Windsor, Ontario



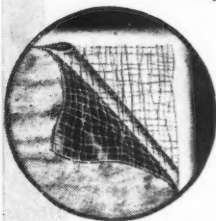
**DEVILBISS**  
*Spray Systems*

**SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS**

## Put This at the Top of Your Immediate "Check List"

*Investigate...  
how Fibreen cuts  
Packaging Costs*

Time Tested . . . Field Tested



Sisal fibre reinforcement for strength — special asphalt for water-proofness — kraft paper to make it scuff-proof—sealed by heat and pressure to produce Fibreen.

# FIBREEN

## Does a Better Packaging Job

Hundreds of manufacturers in practically every industry are saving time, material, freight or handling costs by using Fibreen. They have simplified their shipping room procedure . . . given their products better protection against moisture and dirt damage . . . cut damage claims by assuring shipments arriving at destination in good condition. In many cases, products wrapped in Fibreen go forward on open cars . . . in others, crates replace boxes. Shipping is more compact . . . weight is eliminated . . . more units can be gotten into minimum cars.

## Many Uses for Tough, Moisture-Proof Fibreen

Fibreen is now busy with war packaging. Nevertheless, investigate the full possibilities as applied to your shipping problems . . . as lining for crates and cases, for bags . . . to wrap small, large, heavy, or light bales, and odd shaped packages, etc. . . for LCL, express, or carload shipments.



Manufacturers of SISALKRAFT, FIBREEN, SISAL-X  
SISALTAPE AND COPPER-ARMORED SISALKRAFT

## PRICES

### WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills  
(F.o.b. Pittsburgh only on wrought pipe)  
Base Price—\$200.00 per Net Ton

#### Steel (Butt Weld)

|                 | Black  | Galv.  |
|-----------------|--------|--------|
| 1/4 in. ....    | 63 1/2 | 51     |
| 3/4 in. ....    | 66 1/2 | 56     |
| 1 to 3 in. .... | 68 1/2 | 57 1/2 |

#### Wrought Iron (Butt Weld)

|                      |        |        |
|----------------------|--------|--------|
| 1/4 in. ....         | 24     | 3 1/2  |
| 3/4 in. ....         | 30     | 10     |
| 1 and 1 1/4 in. .... | 34     | 16     |
| 1 1/2 in. ....       | 38     | 18 1/2 |
| 2 in. ....           | 37 1/2 | 18     |

#### Steel (Lap Weld)

|                          |    |        |
|--------------------------|----|--------|
| 2 in. ....               | 61 | 49 1/2 |
| 2 1/2 in. and 3 in. .... | 64 | 52 1/2 |
| 3 1/2 to 6 in. ....      | 66 | 54 1/2 |

#### Wrought Iron (Lap Weld)

|                         |        |        |
|-------------------------|--------|--------|
| 2 in. ....              | 30 1/2 | 12     |
| 2 1/2 to 3 1/2 in. .... | 31 1/2 | 14 1/2 |
| 4 in. ....              | 33 1/2 | 18     |
| 4 1/2 to 8 in. ....     | 32 1/2 | 17     |

#### Steel (Butt, extra strong, plain ends)

|                 |        |        |
|-----------------|--------|--------|
| 1/4 in. ....    | 61 1/2 | 50 1/2 |
| 3/4 in. ....    | 65 1/2 | 54 1/2 |
| 1 to 3 in. .... | 67     | 57     |

#### Wrought Iron (Same as Above)

|                 |    |        |
|-----------------|----|--------|
| 1/4 in. ....    | 25 | 6      |
| 3/4 in. ....    | 31 | 12     |
| 1 to 2 in. .... | 38 | 19 1/2 |

#### Steel (Lap, extra strong, plain ends)

|                      |        |        |
|----------------------|--------|--------|
| 2 in. ....           | 59     | 48 1/2 |
| 2 1/2 and 3 in. .... | 63     | 52 1/2 |
| 3 1/2 to 6 in. ....  | 66 1/2 | 56     |

#### Wrought Iron (Same as Above)

|                     |        |        |
|---------------------|--------|--------|
| 2 in. ....          | 33 1/2 | 15 1/2 |
| 2 1/2 to 4 in. .... | 39     | 22 1/2 |
| 4 1/2 to 6 in. .... | 37 1/2 | 21     |

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card. F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

## CAST IRON WATER PIPE

|                                                                                                                                                                                                                                                                                                                                                             | Per Net Ton |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 6-in. and larger, del'd Chicago....                                                                                                                                                                                                                                                                                                                         | \$54.80     |
| 6-in. and larger, del'd New York..                                                                                                                                                                                                                                                                                                                          | 52.20       |
| 6-in. and larger, Birmingham ....                                                                                                                                                                                                                                                                                                                           | 46.00       |
| 6-in. and larger f.o.b. cars, San Francisco or Los Angeles.....                                                                                                                                                                                                                                                                                             | 69.40       |
| 6-in. and larger f.o.b. cars, Seattle. 71.20                                                                                                                                                                                                                                                                                                                |             |
| Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are \$45 at Birmingham and \$53.80 delivered Chicago, \$59.40 at San Francisco and Los Angeles, and \$70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates. |             |

## BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

|                                             | Seamless Cold Drawn | Hot Rolled | Lap Weld Hot Rolled |
|---------------------------------------------|---------------------|------------|---------------------|
| 2 in. o.d. 13 B.W.G. ....                   | 15.03               | 13.04      | 12.38               |
| 2 1/2 in. o.d. 12 B.W.G. ....               | 20.21               | 17.54      | 16.58               |
| 3 in. o.d. 12 B.W.G. ....                   | 22.48               | 19.50      | 18.36               |
| 3 1/2 in. o.d. 11 B.W.G. ....               | 28.37               | 24.62      | 23.16               |
| 4 in. o.d. 10 B.W.G. ....                   | 35.20               | 30.54      | 28.66               |
| (Extras for less carload quantities)        |                     |            |                     |
| 40,000 lb. or ft. and over .....            | Base                |            |                     |
| 30,000 lb. or ft. to 39,999 lb. or ft. .... | 5%                  |            |                     |
| 20,000 lb. or ft. to 29,999 lb. or ft. .... | 10%                 |            |                     |
| 10,000 lb. or ft. to 19,999 lb. or ft. .... | 20%                 |            |                     |
| 5,000 lb. or ft. to 9,999 lb. or ft. ....   | 30%                 |            |                     |
| 2,000 lb. or ft. to 4,999 lb. or ft. ....   | 45%                 |            |                     |
| Under 2,000 lb. or ft. ....                 | 65%                 |            |                     |

# The JIGMIL has proven to

be a totally new approach to the problems of economical precision BORING and milling of tool and production work

THE fastest producing and most accurate machine in the field.

Many users are reporting consistent experience of two to three times the output and higher quality work.

Automatic positioning of spindle from one location to another in response to measuring rods and push buttons to within less than .0001 (one ten-thousandth part of an inch).

Feather touch, pressure controlled slide locks that positively control locking uniformity, so essential to high precision work.

Unique operation and controls that make possible high precision work with relatively little skill.

JIGMIL  
YOUR  
WORK

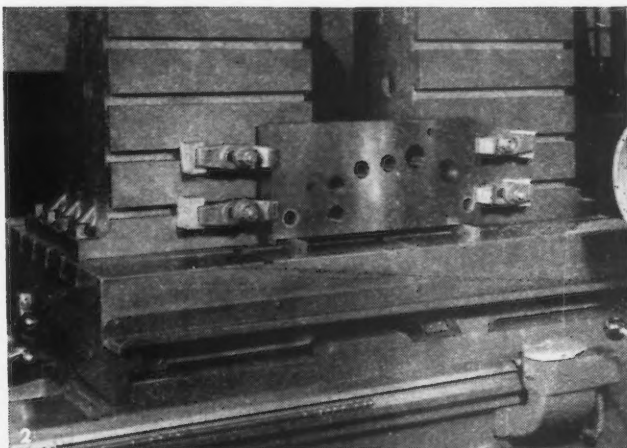
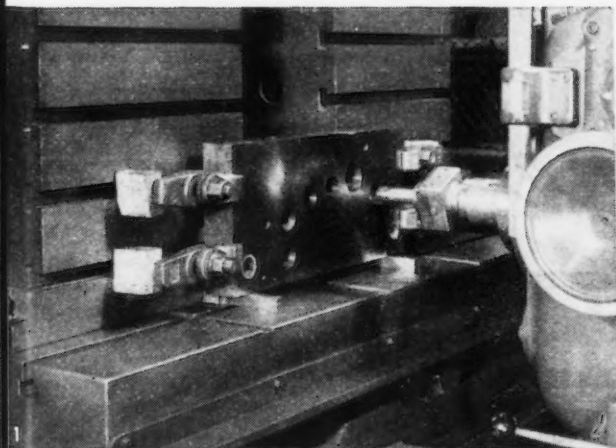


JIGMIL—The world's finest BORING and milling machine is made in Detroit.

★

★

★



★ No. 1—Illustration showing convenience of jig plate boring. No. 2—Eight holes precision bored. Holes spaced within .0001 with total dependence of all spacing on automatic positioning means.

DEVILIEG MACHINE COMPANY

DEVILIEG  
JIGMIL

450 FAIR AVE. FERNDALE 20, (Detroit) MICH.



## STUDYING STRAINS as revealed in PLASTIC GEAR MODELS

• Of interest to engineers is our new method of observing actual stresses in meshing gear teeth. Photoelastic equipment is used, in these tests, to check visually on mathematical calculations of stresses and strains. A polarized light is passed through transparent gear models and the image on the screen shows in color the lines of stress which develop in the meshing teeth. By substituting a camera for the screen, permanent records of tooth stresses can be made.

### FAIRFIELD MFG. CO.

305 So. Earl Avenue  
Lafayette, Ind.



Backed by 25 years of experience in making gears, plus careful research work and latest methods of inspection, Fairfield is able to build into gears that special, superior quality essential for satisfactory use.

With an eye to the future, investigate Fairfield's facilities for making fine gears to order. Write for our brochure on gears.



# BELLEVUE *Controlled Atmosphere* FURNACES

**E**VERY Bellevue furnace is designed and built for a specific job. Hundreds of furnaces and repeat orders in scores of plants is evidence enough that you can have complete confidence in Bellevue engineers to solve your heat treating problems. Send for complete details.

**BELLEVUE INDUSTRIAL FURNACE CO.**

2974 BELLEVUE AVENUE

DETROIT, MICH.

## PRICES

**Billets, Rerolling, per gross ton**—Continental Steel Corp. may charge Acme Steel in Chicago switching area \$34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend Lease) \$41 mill; Wheeling Steel Corp. 4 in. sq. or larger \$37.75, smaller \$39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at \$39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. \$41 mill; Continental Steel Corp. (1 1/4 x 1 1/4) \$39.50, (2 x 2) \$40.60 Kokomo, Ind. (these prices include size extra); Keystone Steel & Wire Co. \$36.40 Peoria; Connors Steel Co. \$50.60 Birmingham; Ford Motor Co. \$34 Dearborn, Mich.; Geneva Steel Co. \$58.64 f.o.b. Pacific Coast; Pgh. Steel Co. \$43.50; Kaiser Co. \$58.64 f.o.b. Los Angeles.

**Structural Shapes**—Phoenix Iron Co. 2.35c basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

**Rails, per gross ton**—Sweet Steel Co. (rail steel) \$50 mill; West Virginia Rail Co. (light weight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron, \$45 Pueblo.

**Hot Rolled Plate**—Granite City Steel Co. 2.65c. mill; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

**Merchant Bars**—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co. 2.35c. Chicago; Calumet Steel Div., Boston; Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Laclede Steel Co., sales to LaSalle Steel grants Chicago base, f.o.b. Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

**Pipe Skelp**—Wheeling Steel, Benwood, 2.95c.

**Reinforcing Bars**—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

**Cold Finished Bars**—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh; Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo; Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

**Alloy Bars**—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

**Hot Rolled Strip**—Joslyn Mfg. & Supply Co. 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

**Hot Rolled Sheets**—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel, 2.25c. Parkersburg.

**Galvanized Sheets**—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co. 3.85c. Parkersburg; Continental Steel Co. Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

**Pipe and Tubing**—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

**Black Sheets**—Empire Sheet and Tinplate Co. maximum base price mill is 2.45c. per 100 lb. with differentials, transportation charges, etc. provided in RPS. No. 6.

**Wire Products**—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/16 in., 2.20c.; rods, heavier than 9/16, 2.85c.; bright wire, 2.725c.; bright nails, 2.90c.; iron and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire 3.90c.; plain staples, 2.55c.; galvanized staples 2.65c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

## PRICES

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

#### Machine and Carriage Bolts:

Base discount less case lots

|                                           | Per Cent Off List |
|-------------------------------------------|-------------------|
| 1/16 & 5/16 in. x 6 in. & shorter.....    | 63 1/2            |
| 3/16 in. & smaller x 6 in. & shorter..... | 65 1/2            |
| 1/2 to 1 in. x 6 in. & shorter.....       | 61                |
| 1 1/2 in. and larger, all lengths.....    | 59                |
| All diameters over 6 in. long.....        | 59                |
| Ag. all sizes.....                        | 62                |
| Flow bolts.....                           | 65                |

#### Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

|                                                                                                                                                                                      |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1/16 in. and smaller.....                                                                                                                                                            | 62 |
| 3/16 to 1 in. inclusive.....                                                                                                                                                         | 59 |
| 1 1/2 to 1 3/4 in. inclusive.....                                                                                                                                                    | 57 |
| 2 in. and larger.....                                                                                                                                                                | 56 |
| On above bolts and nuts, excepting flow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments. |    |

#### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

|                                                    |    |
|----------------------------------------------------|----|
| 1/16 in. and smaller.....                          | 64 |
| 3/16 in. and smaller.....                          | 62 |
| 1/2 in. through 1 in.....                          | 60 |
| 1 1/16 in. through 1 in.....                       | 59 |
| 1 1/2 in. through 1 3/4 in.....                    | 57 |
| 2 in. and larger.....                              | 56 |
| In full keg lots, 10 per cent additional discount. |    |

#### Stove Bolts

Consumer

|                                                                                                                         |           |
|-------------------------------------------------------------------------------------------------------------------------|-----------|
| Packages, nuts loose.....                                                                                               | 71 and 10 |
| In packages, with nuts attached.....                                                                                    | 71        |
| In bulk.....                                                                                                            | 80        |
| On stove bolts freight allowed up to 75c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over. |           |

#### Large Rivets

(1/2 in. and larger)

Base per 100 Lb.

|                                                        |        |
|--------------------------------------------------------|--------|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham..... | \$3.75 |
|--------------------------------------------------------|--------|

#### Small Rivets

(7/16 in. and smaller)

Per Cent Off List

|                                                        |          |
|--------------------------------------------------------|----------|
| F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham..... | 65 and 5 |
|--------------------------------------------------------|----------|

#### Cap and Set Screws

Consumer

|                                                                                                            | Per Cent Off List |
|------------------------------------------------------------------------------------------------------------|-------------------|
| Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.....          | 64                |
| Upset set screws, cup and oval points                                                                      | 71                |
| Milled studs.....                                                                                          | 46                |
| Flat head cap screws, listed sizes.....                                                                    | 36                |
| Phillister head cap, listed sizes.....                                                                     | 51                |
| Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over. |                   |

#### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

|                         | 20x14 in. | 20x28 in. |
|-------------------------|-----------|-----------|
| 3-lb. coating I.C.....  | \$6.00    | \$12.00   |
| 15-lb. coating I.C..... | 7.00      | 14.00     |
| 20-lb. coating I.C..... | 7.50      | 15.00     |

#### ELECTRICAL SHEETS

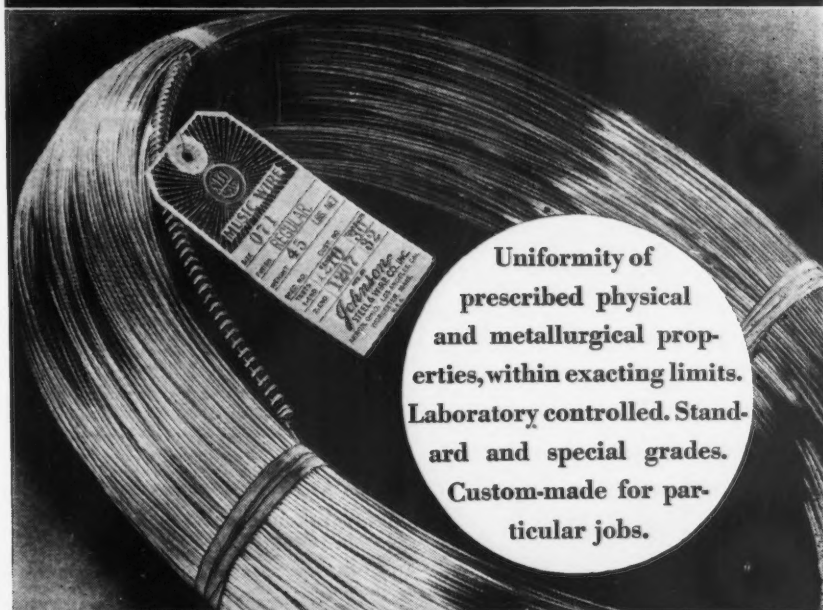
(Base, f.o.b. Pittsburgh)

Per Lb.

|                     |        |
|---------------------|--------|
| Field grade.....    | 3.30c. |
| Armature.....       | 3.65c. |
| Electrical.....     | 4.15c. |
| Motor.....          | 5.05c. |
| Dynamo.....         | 5.75c. |
| Transformer 72..... | 6.25c. |
| Transformer 65..... | 7.25c. |
| Transformer 58..... | 7.75c. |
| Transformer 52..... | 8.55c. |

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

# JOHNSON wire



Uniformity of prescribed physical and metallurgical properties, within exacting limits. Laboratory controlled. Standard and special grades. Custom-made for particular jobs.

## JOHNSON STEEL & WIRE CO., INC.

WORCESTER I, MASSACHUSETTS.

NEW YORK

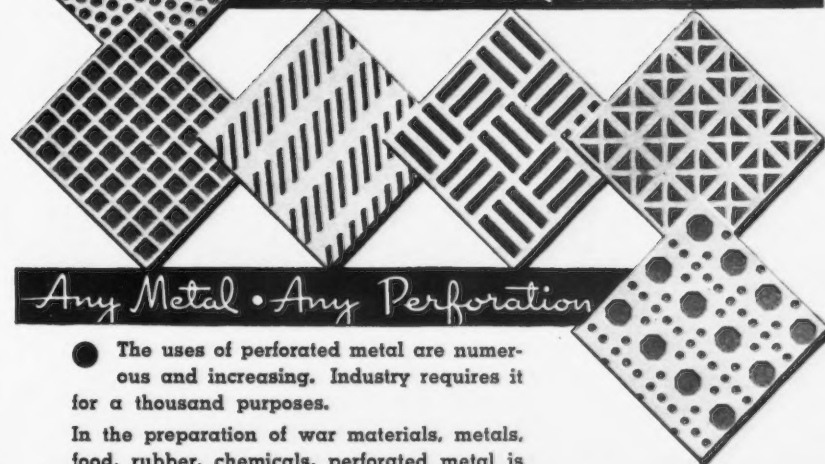
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CHICAGO

LOS ANGELES

# PERFORATED METAL

INDUSTRIAL and ORNAMENTAL



Any Metal • Any Perforation

The uses of perforated metal are numerous and increasing. Industry requires it for a thousand purposes.

In the preparation of war materials, metals, food, rubber, chemicals, perforated metal is required to perform an important role.

## The Harrington & King PERFORATING CO.

5657 FILLMORE STREET—CHICAGO 44, ILL.

Eastern Office, 114 Liberty Street, New York 6, N. Y.



# PIG IRON PRICES

| BASING POINT* BASE PRICES |         |               |           |          |           | DELIVERED PRICES† (BASE GRADES) |                    |              |         |               |           |          |           |
|---------------------------|---------|---------------|-----------|----------|-----------|---------------------------------|--------------------|--------------|---------|---------------|-----------|----------|-----------|
| Basing Point              | Basic   | No. 2 Foundry | Malleable | Bessemer | Low Phos. | Consuming Point                 | Basing Point       | Freight Rate | Basic   | No. 2 Foundry | Malleable | Bessemer | Low Phos. |
| Bethlehem                 | \$25.50 | \$26.00       | \$26.50   | \$27.00  |           | Boston                          | Everett            | \$ .50       | \$26.00 | \$26.50       | \$27.00   | \$27.50  |           |
| Birdsboro                 | 25.50   | 26.00         | 26.50     | 27.00    | \$30.50   | Boston                          | Birdsboro-Steelton | 4.02         |         |               |           |          | \$34.52   |
| Birmingham                | 20.00   | 21.38         |           | 26.00    |           | Brooklyn                        | Bethlehem          | 2.50         | 28.00   | 28.50         | 29.00     | 29.50    |           |
| Buffalo                   | 24.00   | 25.00         | 25.50     | 26.00    | 30.50     | Brooklyn                        | Birdsboro          | 2.92         |         |               |           |          | 33.42     |
| Chicago                   | 24.50   | 25.00         | 25.00     | 25.50    |           | Canton                          | Cleveland          | 1.39         | 25.89   | 26.39         | 26.39     | 26.89    |           |
| Cleveland                 | 24.50   | 25.00         | 25.00     | 25.50    |           | Canton                          | Buffalo            | 3.19         |         |               |           |          | 33.69     |
| Detroit                   | 24.50   | 25.00         | 25.00     | 25.50    |           | Cincinnati                      | Birmingham         | 4.06         | 24.06   | 25.44         |           |          |           |
| Duluth                    | 25.00   | 25.50         | 25.50     | 26.00    |           | Cincinnati                      | Hamilton           | 1.11         |         |               | 26.11     |          |           |
| Erie                      | 24.50   | 25.00         | 25.50     | 26.00    |           | Cincinnati                      | Buffalo            | 4.40         |         |               |           |          | 34.90     |
| Everett                   | 25.50   | 26.00         | 26.50     | 27.00    |           | Jersey City                     | Bethlehem          | 1.53         | 27.03   | 27.53         | 28.03     | 28.53    |           |
| Granite City              | 24.50   | 25.00         | 25.00     | 25.50    |           | Jersey City                     | Birdsboro          | 1.94         |         |               |           |          | 32.44     |
| Hamilton                  | 24.50   | 25.00         | 25.00     |          |           | Los Angeles                     | Provo              | 4.95         | 27.45   | 27.95         |           |          |           |
| Neville Island            | 24.50   | 25.00         | 25.00     | 25.50    |           | Los Angeles                     | Buffalo            | 15.41        |         |               |           |          | 45.91     |
| Provo                     | 22.50   | 23.00         |           |          |           | Mansfield                       | Cleveland & Toledo | 1.94         | 26.44   | 26.94         | 26.94     | 27.44    |           |
| Sharpsville 1             | 24.50   | 25.00         | 25.00     | 25.50    |           | Mansfield                       | Buffalo            | 3.36         |         |               |           |          | 33.86     |
| Sparrows Point            | 25.50   | 26.00         |           |          |           | Philadelphia                    | Swedeland          | .84          | 26.34   | 26.84         | 27.34     | 27.84    |           |
| Steelton                  | 25.50   |               |           |          | 30.50     | Philadelphia                    | Birdsboro          | 1.24         |         |               |           |          | 31.74     |
| Swedeland                 | 25.50   | 26.00         | 26.50     | 27.00    |           | San Francisco                   | Provo              | 4.95         | 27.45   | 27.95         |           |          | 45.91     |
| Toledo                    | 24.50   | 25.00         | 25.00     | 25.50    |           | San Francisco                   | Buffalo            | 15.41        |         |               |           |          | 45.91     |
| Youngstown                | 24.50   | 25.00         | 25.00     | 25.50    |           | Seattle                         | Provo              | 4.95         | 27.45   | 27.95         |           |          | 45.91     |
|                           |         |               |           |          |           | Seattle                         | Buffalo            | 15.41        |         |               |           |          | 45.91     |
|                           |         |               |           |          |           | St. Louis                       | Granite City       | .50          | 25.00   | 25.50         | 25.50     | 26.00    |           |
|                           |         |               |           |          |           | St. Louis                       | Buffalo            | 7.07         |         |               |           |          | 37.57     |

\* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

\* Maximum per gross ton, established by OPA February 14, 1945.

† Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, \$42.34. High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switch-

ing charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, \$2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and \$1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackson, Ohio—\$30.50; f.o.b. Buffalo—\$31.75. Add \$1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add \$1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are \$1.00 per ton above silvery iron prices of comparable analysis.

## METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

Copper, electrolytic, 150 and 200 mesh.....21½ to 23½c.

Copper, reduced, 150 and 200 mesh.....20½ to 25½c.

Iron, commercial, 100 and 200 mesh 96 + % Fe.....12½ to 15c.

Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots.....4c.

Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots.....63c.

Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe 30 to 33c.

Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe.....42c.

Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe.....90c.

Aluminum, 100 and 200 mesh...23 to 27c.

Antimony, 100 mesh.....20.6c.

Cadmium, 100 mesh.....\$1.

Chromium, 150 mesh.....\$1.03.

Lead, 100, 200 & 300 mesh...11½ to 12½c.

Manganese, 150 mesh.....61c.

Nickel, 150 mesh.....51½c.

Solder powder, 100 mesh. 8½c. plus metal

Tin, 100 mesh.....58½c.

Tungsten metal powder, 98%-99%, any quantity, per lb.....\$2.60

Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb. \$2.60

Under 100 lb. ....\$3.00

\*Freight allowed east of Mississippi.

## COKE

| Furnace, beehive (f.o.b. oven) | Net Ton |
|--------------------------------|---------|
| Connellsville, Pa. ....        | \$7.50* |
| Foundry, beehive (f.o.b. oven) |         |
| Fayette Co., W. Va. ....       | 8.10    |
| Connellsville, Pa. ....        | 9.00    |
| Foundry, By-Product            |         |
| Chicago, del'd .....           | 13.35   |
| Chicago, f.o.b. ....           | 12.60   |
| New England, del'd .....       | 14.25   |
| Kearny, N. J., f.o.b. ....     | 12.65   |
| Philadelphia, del'd .....      | 12.88   |
| Buffalo, del'd .....           | 13.00   |
| Portsmouth, Ohio, f.o.b. ....  | 11.10   |
| Painesville, Ohio, f.o.b. .... | 11.75   |
| Erie, del'd .....              | 12.75   |
| Cleveland, del'd .....         | 12.80   |
| Cincinnati, del'd .....        | 12.85   |
| St. Louis, del'd .....         | 13.85   |
| Birmingham, del'd .....        | 10.50   |

\*Hand drawn ovens using trucked coal permitted to charge \$8.00 per ton plus transportation charges.



# LEE

## Quality Springs

ALL SHAPES • ALL SIZES • ALL MATERIALS

### LEE SPRING COMPANY, Inc.

30 MAIN STREET      BROOKLYN, N.Y.





## PRICES

### CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

#### Chromium-Nickel Alloys

|                   | No. 304 | No. 302 |
|-------------------|---------|---------|
| Forging billets   | 21.25c. | 20.40c. |
| Bars              | 25.00c. | 24.00c. |
| Plates            | 29.00c. | 27.00c. |
| Structural shapes | 25.00c. | 24.00c. |
| Sheets            | 36.00c. | 34.00c. |
| Hot rolled strip  | 23.50c. | 21.50c. |
| Cold rolled strip | 30.00c. | 28.00c. |
| Drawn wire        | 25.00c. | 24.00c. |

#### Straight-Chromium Alloys

|            | No. 410  | No. 430 | No. 442  | No. 446  |
|------------|----------|---------|----------|----------|
| F. Billets | 15.725c. | 16.15c. | 19.125c. | 22.375c. |
| Bars       | 18.50c.  | 19.00c. | 22.50c.  | 27.50c.  |
| Plates     | 21.50c.  | 22.00c. | 25.50c.  | 30.50c.  |
| Sheets     | 26.50c.  | 29.00c. | 32.50c.  | 36.50c.  |
| Hot strip  | 17.00c.  | 17.50c. | 24.00c.  | 35.00c.  |
| Cold strip | 22.00c.  | 22.50c. | 32.00c.  | 52.00c.  |

#### Chromium-Nickel Clad Steel (20%)

|        | No. 304  |
|--------|----------|
| Plates | 18.00c.* |
| Sheets | 19.00c.  |

\*Includes annealing and pickling.

### REFRACTORIES

(F.o.b. Works)

#### Fire Clay Brick

|                                         | Per 1000 |
|-----------------------------------------|----------|
| Super-duty brick, St. Louis             | \$66.55  |
| First quality, Pa., Md., Ky., Mo., Ill. | 52.85    |
| First quality, New Jersey               | 57.70    |
| Sec. quality, Pa., Md., Ky., Mo., Ill.  | 47.95    |
| Sec. quality, New Jersey                | 52.55    |
| No. 1 Ohio                              | 44.30    |
| Ground fire clay, net ton               | 7.80     |

#### Silica Brick

|                                  |         |
|----------------------------------|---------|
| Pennsylvania and Birmingham      | \$52.85 |
| Chicago District                 | 60.65   |
| Silica cement, net ton (Eastern) | 9.25    |

#### Chrome Brick

|                                                              | Per Net Ton |
|--------------------------------------------------------------|-------------|
| Standard chemically bonded, Balt., Plymouth Meeting, Chester | \$54.00     |

#### Magnesite Brick

|                              |         |
|------------------------------|---------|
| Standard, Balt. and Chester  | \$76.00 |
| Chemically bonded, Baltimore | 65.00   |

#### Grain Magnesite

|                                                        |         |
|--------------------------------------------------------|---------|
| Domestic, f.o.b. Balt. and Chester in sacks (carloads) | \$43.48 |
| Domestic, f.o.b. Chewelah, Wash. (in bulk)             | 22.00   |

### EXCEPTIONS TO RPS 6

Ingots, carbon, rerolling—Phoenix Iron Co. may charge \$38.75; Kaiser Co., \$43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., \$34.25; Pgh. Steel Co., \$33.10.

Ingots, carbon, forging—Phoenix Iron Co. may charge \$43.00; Empire Sheet & Tinplate Co., \$39.25, f.o.b. Mansfield, Ohio; West Coast producers, \$48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., \$38.10.

Ingots, alloy—C/I delivered Detroit add \$2.00; delivered East Michigan add \$3.00. Connors Steel Co. may charge \$45.00 f.o.b. Birmingham.

Slabs, per gross ton—Andrews Steel Co. \$41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tinplate Corp. \$41; Phoenix Iron Co. (rerolling) \$41, (forging) \$47; Granite City Steel \$47.50; Kaiser Co., (rerolling) \$58.64, (forging) \$64.64, f.o.b. Los Angeles.

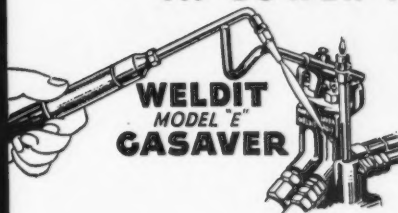
Blooms, per gross ton—Phoenix Iron Co. (rerolling) \$41; (forging) \$47; Pgh. Steel Co. (rerolling) \$38.25, (forging) \$44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger \$37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) \$58.64, (forging) \$64.64 (shell steel) \$74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tinplate Co. \$39 mill; Wheeling Steel Corp. \$38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. \$50 basing pts.; Follansbee Steel Corp. \$49.50 Toronto, Ohio; Phoenix Iron Co. \$47 mill; Geneva Steel Co. \$64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. \$49.50; Kaiser Co. \$64.64, (shell steel) \$74.64, f.o.b. Los Angeles.

# Safe Welding

## AT LOWER PRODUCTION COSTS



The Weldit Gasaver shuts off the welding flame when not in use. . . . Conserves essential materials by cutting oxygen and acetylene consumption as much as **fifty** per cent. Prevents injury to workmen—or sudden fires—from dangerous idle torch flames. . . . Adjustment remains unaltered between welds.

When the Weldit Gasaver has been installed, you simply hang idle torch on the handy lever rod. Weight of torch pulls rod down, thus automatically shutting off supply lines. Relight instantly by passing torch over Gasaver pilot light. No bother. . . . No time lost. . . . **No readjusting required.** . . . Price \$10.00 at Detroit. Order today.

### Better Soldering, Annealing and Heating Jobs



The Weldit Model CW Blowpipe is in daily use by many foremost industrial plants. . . . Built in accordance with the recommendations of leading fabricators of sheet metal products. . . . Operates on either natural gas, manufactured gas, or other low temperature fuel gas and compressed air. Stands up under rough shop use. . . . Send for literature.

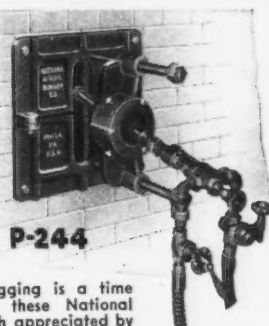
## WELDIT ACETYLENE CO.

641 BAGLEY AVENUE • DETROIT 26, MICH.

### FOR ALL TYPES of INDUSTRIAL FURNACES

## Clean Burning!

Movable  
Flame  
Billet  
Heating  
Oil Burner



Freedom from clogging is a time saving feature of these National Airol Burners, much appreciated by the numerous metal working plants wherein they have been installed.

The burner is arranged on a sliding carriage with a ball and socket adapter, permitting placement of the flame to any part of the furnace, easily, exactly . . . also allowing the withdrawal of the burner for inspection or replacement of the tip.

Will burn heavy oil or tar, using steam or compressed air for atomization. Holds as steady as a gas flame.

Tips for cone, round or flat flame of any angle.



Cross-Section of Type SA Oil Burner

# NATIONAL AIROIL FUEL OIL - GAS BURNERS

Steam Atomizing Oil Burners—Mechanical Pressure Atomizing Oil Burners—Low Air Pressure Oil Burners—Motor-driven Rotary Oil Burners—Industrial Gas Burners—Combination Gas and Oil Burners—Fuel Oil Pumping Units—Fuel Oil Heaters—Fuel Oil Strainers and other accessories.

## NATIONAL AIROIL BURNER COMPANY, INCORPORATED

1271 East Sedgley Ave., Philadelphia 34, Pa.  
ESTABLISHED 1912 INCORPORATED 1917

# FERROALLOY PRICES

## Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn. Carload lots (bulk) ..... \$135.00 Carload lots (packed) ..... 141.00 Less ton lots (packed) ..... 148.50 \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.

## Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

|                                                    |      |
|----------------------------------------------------|------|
| 96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.     |      |
| Carload, bulk                                      | 36c. |
| L.c.l. lots                                        | 38c. |
| 95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe. |      |
| Carload, bulk                                      | 34c. |
| L.c.l. lots                                        | 35c. |

## Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

|            |                 |
|------------|-----------------|
| 16-19% Mn  | 19-21% Mn       |
| 3% max. Si | 3% max. Si      |
| Carloads   | \$35.00 \$36.00 |
| Less ton   | 47.50 48.50     |

## Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

|           | Eastern Zone | Central Zone | Western Zone |
|-----------|--------------|--------------|--------------|
| 50% Si    | 6.65c.       | 7.10c.       | 7.25c.       |
| 75% Si    | 8.05c.       | 8.20c.       | 8.75c.       |
| 80-90% Si | 8.90c.       | 9.05c.       | 9.55c.       |
| 90-95% Si | 11.05c.      | 11.20c.      | 11.65c.      |

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

## Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, \$45.50 per G. T. f.o.b. Jackson, Ohio. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

## Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

|                | Eastern Zone | Central Zone | Western Zone |
|----------------|--------------|--------------|--------------|
| 96% Si, 2% Fe. | 13.10c.      | 13.55c.      | 16.50c.      |
| 97% Si, 1% Fe. | 13.45c.      | 13.90c.      | 16.80c.      |

## Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

|                 | Eastern Zone | Central Zone | Western Zone |
|-----------------|--------------|--------------|--------------|
| Carload, bulk   | 3.35c.       | 3.50c.       | 3.65c.       |
| 2000 lb-carload | 3.8c.        | 4.2c.        | 4.25c.       |

## Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

|                                                                  | Eastern Zone | Central Zone | Western Zone |
|------------------------------------------------------------------|--------------|--------------|--------------|
| Carload, bulk                                                    | 6.05c.       |              |              |
| 2000 lb. to carload                                              | 6.70c.       |              |              |
| Under 2000 lb.                                                   | 6.90c.       |              |              |
| Briquets, contract, basis carlots, bulk freight allowed, per lb. | 5.80c.       |              |              |
| 2000 lb. to carload                                              | 6.30c.       |              |              |
| Less ton lots                                                    | 6.55c.       |              |              |

## Ferrochrome

(65-72% Cr, 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

|            | Eastern Zone | Central Zone | Western Zone |
|------------|--------------|--------------|--------------|
| 0.06% C    | 3.00c.       | 23.40c.      | 24.00c.      |
| 0.10% C    | 2.50c.       | 22.90c.      | 23.50c.      |
| 0.15% C    | 2.00c.       | 22.40c.      | 23.00c.      |
| 0.20% C    | 2.150c.      | 21.90c.      | 22.50c.      |
| 0.50% C    | 21.00c.      | 21.40c.      | 22.00c.      |
| 1.00% C    | 20.50c.      | 20.90c.      | 21.50c.      |
| 2.00% C    | 19.50c.      | 19.90c.      | 21.00c.      |
| 66-71% Cr, |              |              |              |
| 4-10% C    | 13.00c.      | 13.40c.      | 14.00c.      |
| 62-66% Cr, |              |              |              |
| 5-7% C     | 13.50c.      | 13.90c.      | 14.50c.      |

## High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

## Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

|                  | Carloads, Ton | Bulk    | Less Ton |
|------------------|---------------|---------|----------|
| 0.10% max. C, 1  | 23.00c.       | 23.40c. | 23.65c.  |
| or 2% max. Si, 1 |               |         |          |
| 0.15% max. C, 1  | 22.00c.       | 22.40c. | 22.65c.  |
| or 2% max. Si, 1 |               |         |          |
| 0.30% max. C, 1  | 21.00c.       | 21.40c. | 21.65c.  |
| or 2% max. Si, 1 |               |         |          |
| 0.50% max. C, 1  | 20.00c.       | 20.40c. | 20.65c.  |
| or 2% max. Si, 1 |               |         |          |
| 0.75% max. C,    |               |         |          |
| 7.00% max. Si, 1 | 16.00c.       | 16.40c. | 16.65c.  |

## Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

|               | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Carload, bulk | 8.25c.       | 8.55c.       | 8.95c.       |
| Ton lots      | 8.75c.       | 9.25c.       | 10.75c.      |
| Less ton lots | 9.00c.       | 9.50c.       | 11.00c.      |

## Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

|               | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Carload, bulk | 6.05c.       | 6.30c.       | 6.60c.       |
| Ton lots      | 6.65c.       | 7.55c.       | 8.55c.       |
| Less ton lots | 6.80c.       | 7.80c.       | 8.80c.       |

## Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

|               | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Carloads      | 15.50c.      | 16.00c.      | 18.05c.      |
| Ton lots      | 16.50c.      | 17.35c.      | 19.10c.      |
| Less ton lots | 17.00c.      | 17.35c.      | 19.60c.      |

## Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

|               | Cast   | Turnings | Distilled |
|---------------|--------|----------|-----------|
| Ton lots      | \$1.80 | \$2.30   | \$5.00    |
| Less ton lots | 2.30   | 2.80     | 5.75      |

## Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot ..... 45c.

## Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

|               | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Ton lots      | \$1.20       | \$1.2075     | \$1.229      |
| Less ton lots | 1.30         | 1.3075       | 1.329        |

## Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales. 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

|               | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| Ton lots      | \$1.89       | \$1.903      | \$1.935      |
| Less ton lots | 2.01         | 2.023        | 2.055        |

## Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

|               | Eastern Zone | Central Zone | Western Zone |
|---------------|--------------|--------------|--------------|
| 11,200 lb.    |              |              |              |
| or more       | \$1.90       | \$1.9125     | \$1.9445     |
| Ton lots      | 2.00         | 2.09125      | 2.0445       |
| Less ton lots | 2.10         | 2.1125       | 2.1445       |

## Other Ferroalloys

Ferrotungsten, Standard grade lump or 1/4" down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa. New York, Pa., per lb. contained tungsten, 10,000 lb. or more. .... \$1.90

Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va. .... \$2.70

Open hearth ..... \$2.80  
Crucible ..... \$2.90  
Primors

Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal. .... \$1.50

Vanadium pentoxide, 88-92% V<sub>2</sub>O<sub>5</sub> technical grade, contract basis, any quantity, per lb. contained V<sub>2</sub>O<sub>5</sub>. Spot sales add 5c. per lb. contained V<sub>2</sub>O<sub>5</sub>. .... \$1.10

Silicaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)

Carload lots ..... 25c.  
2000 lb. to carload ..... 26c.

Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)

Carload lots ..... 58c.  
2000 lb. to carload ..... 59c.

Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis

No. 1 ..... 87.5c.  
No. 6 ..... 60c.  
No. 79 ..... 45c.

Bortram, f.o.b. Niagara Falls

Ton lots, per lb. .... 45c.  
Less ton lots, per lb. .... 50c.

Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.

2000 lb. lots ..... \$2.25  
Under 2000 lb. lots ..... \$2.30

Ferrotitanium, 40-45%, 0.10% C, max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti.

Less ton lots ..... \$1.23  
Less ton lots ..... \$1.25

Ferrotitanium, 20-25%, 0.10% C, max., ton lots, per lb. contained titanium

Less ton lots ..... \$1.35  
Less ton lots ..... \$1.40

High-carbon ferrotitanium, 15-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y.

freight allowed East of Mississippi River, north of Baltimore and St. Louis, per carload. .... \$142.50

Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton. .... 53.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton. .... \$75.00

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.

95c.

Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.

80c.

Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per lb. contained Mo.

80c.

Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per lb. contained Mo.

80c.

Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add 1/4c. for spot sales

Carload lots ..... 14c.

Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy

Carload, bulk ..... 4.6c.

Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk

5.75c.  
Ton lots ..... 7.25c.

Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.

Car lots ..... 8.00c.  
Ton lots ..... 8.75c.  
Less ton lots ..... 9.25c.